

Delivering Excellence Through  
Innovation & Technology



# Ricardo plc

## Annual Report & Accounts 2017



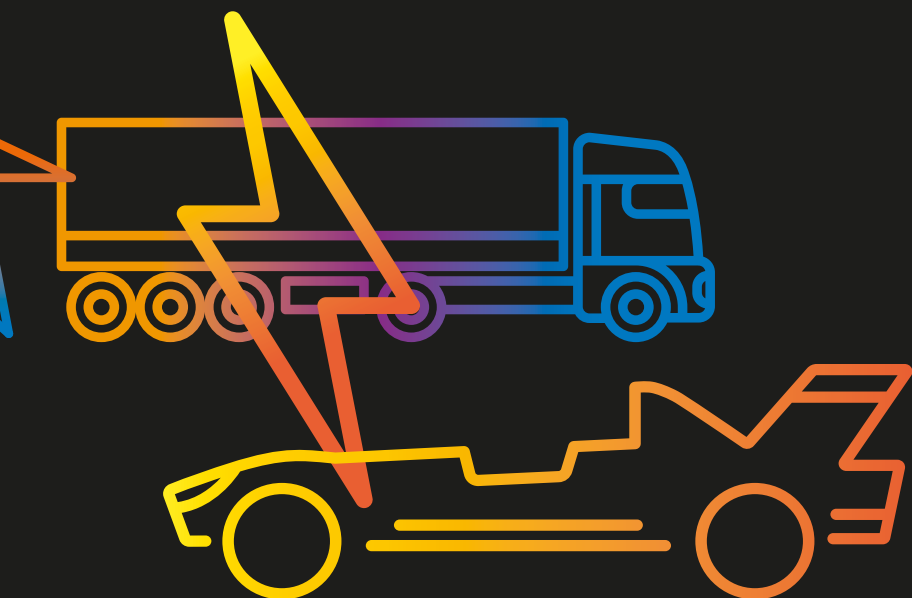
# Who we are

Ricardo is a global engineering, technical, environmental and strategic consultancy business. We also manufacture and assemble niche, high-quality and high-performance products. Our ambition is to be the world's pre-eminent organisation focused on the development and application of solutions to meet the challenges within Transport & Security, Energy, and Scarce Resources & Waste.

Drawing on over 100 years of commitment to research and development, Ricardo's team of over 2,900 professional engineers, consultants, scientists and support staff delivers innovative and class-leading products and services for the benefit of a broad customer base.

Our customers include the world's major transportation original equipment manufacturers and operators, supply chain organisations, energy companies, financial institutions and government agencies.

The delivery of our products and services is made possible by our people, who are at the heart of our business and are the bedrock of our success. Ricardo cultivates the talent and the engineering and scientific excellence of its professionals and invests in their development for the benefit of the individual, for our organisation and for its stakeholders. Ricardo's community is bound together and driven by our corporate values of Respect, Integrity, Innovation, and Passion.



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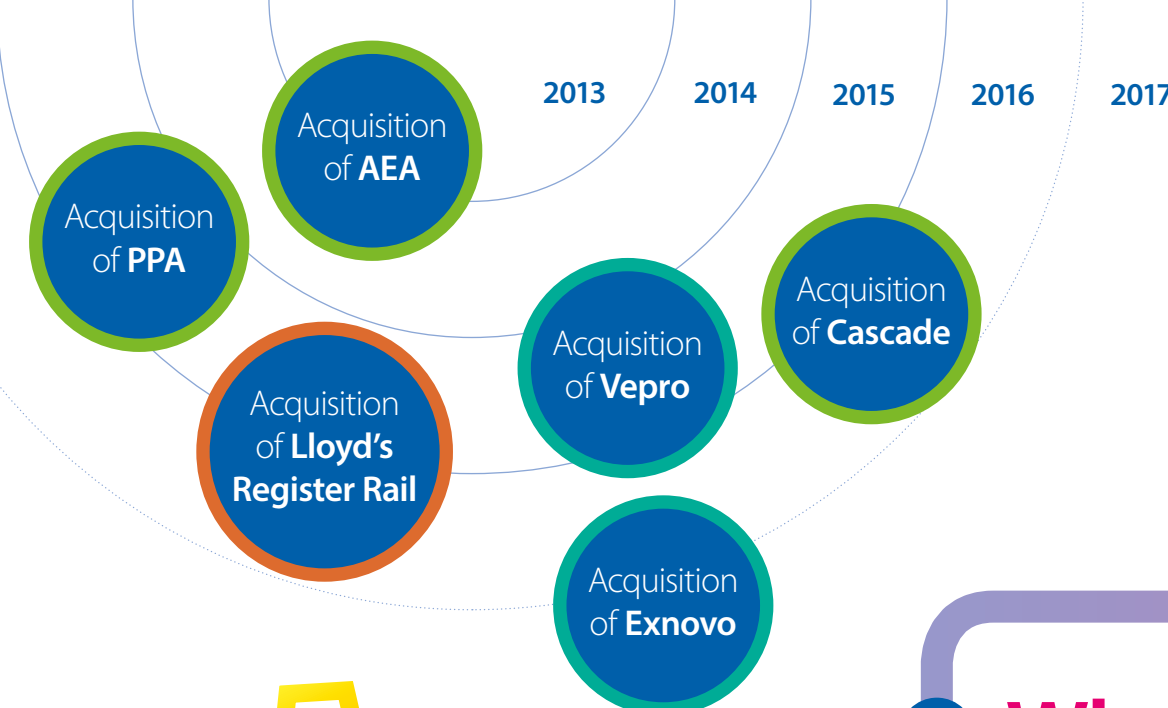
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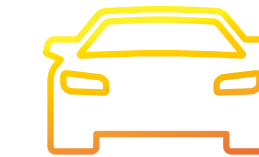
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# This year



**65,000,000+**  
 Data points collected and managed through Ricardo's proprietary air quality software – MODUS

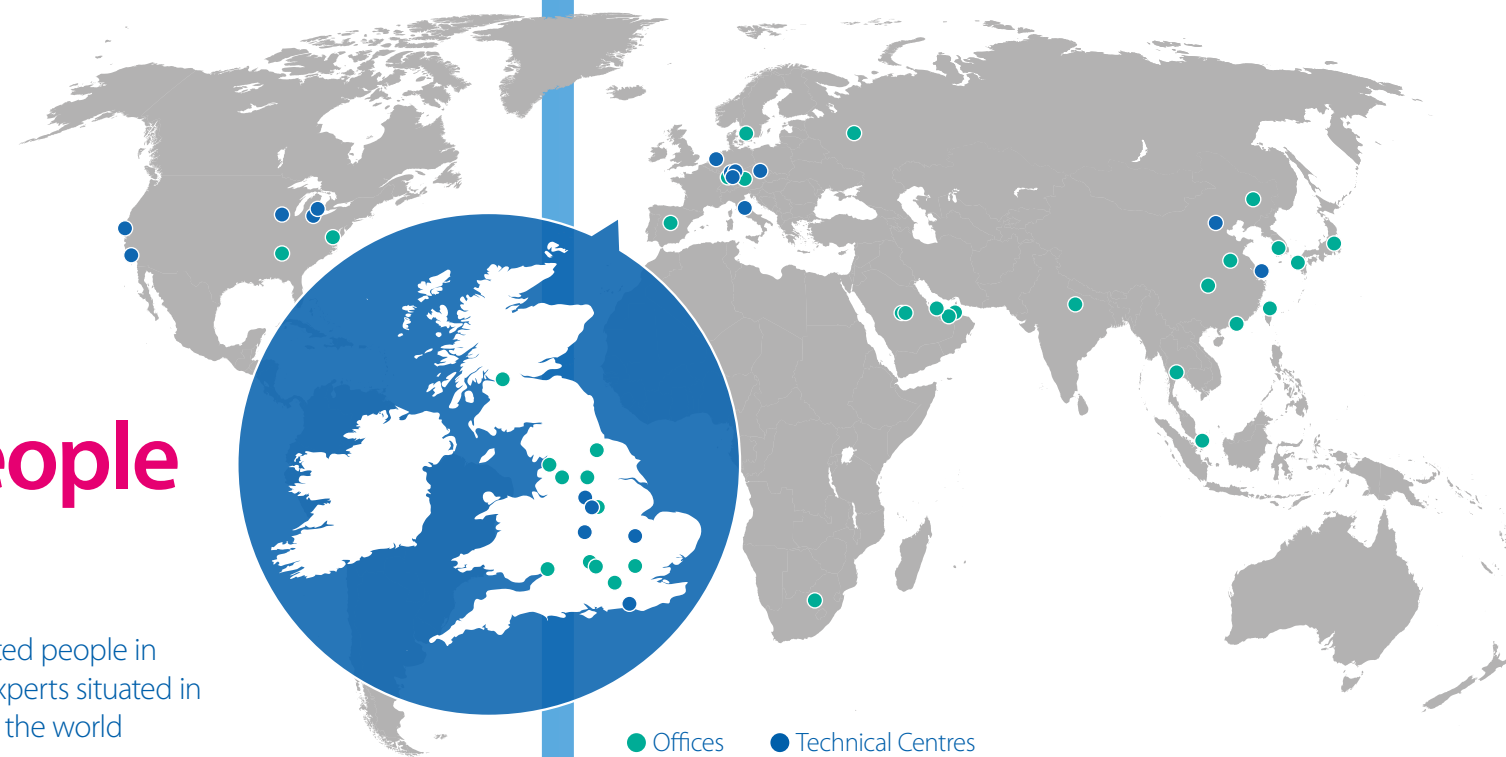


**AM-RB 001**  
 Awarded contract to manufacture advanced transmission for ground-breaking Aston Martin Valkyrie hypercar  
See case study on pages 64 to 67

**102**

years of Delivering Excellence Through Innovation & Technology

## Where we are



## Our people

**2,900+**

Dedicated and talented people in our global team of experts situated in key locations around the world

**Engineers** **Consultants** **Scientists**

**68** nationalities **53** sites in **21** countries

## What we do

### Technical Consulting

We provide engineering, design and consulting services to customers across a range of market sectors. We also provide independent assurance services to the rail industry

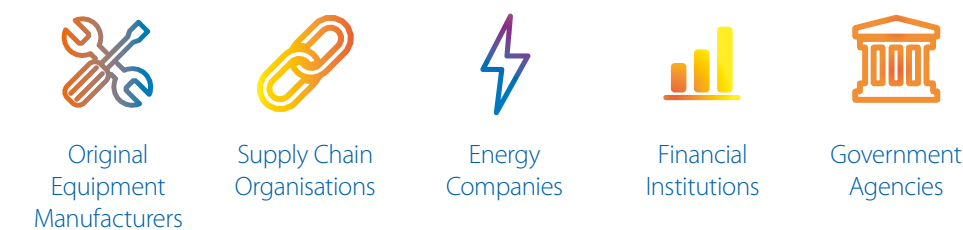


### Performance Products

We manufacture and assemble low-volume, high-quality, high-performance products including transmissions, engines and complete vehicles. We also develop and sell licences for a portfolio of innovative computer-aided engineering software products



## Who we work with



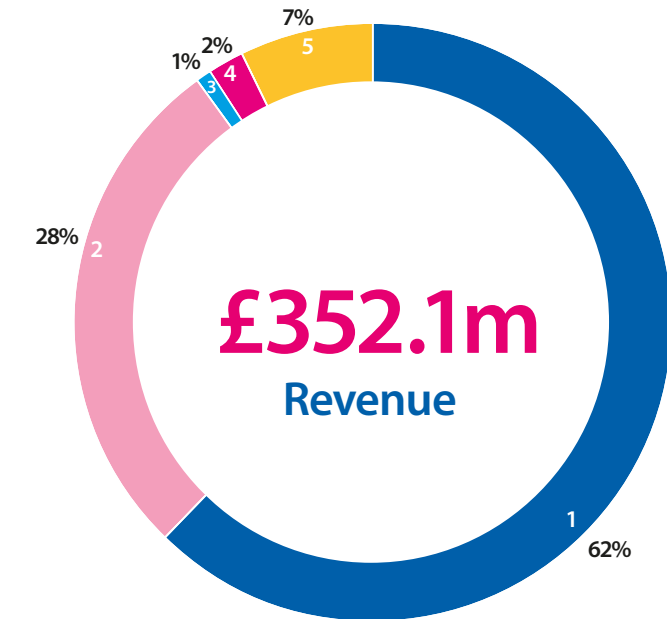
## Key highlights



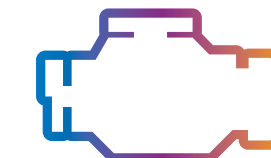
**PanMon**  
 Advanced pantograph monitoring technology – PanMon, which was shortlisted in the prestigious RailTech Europe Innovation Awards  
See case study on pages 60 to 63



**VERC**  
 Ricardo's Vehicle Emissions Research Centre (VERC) is the first vehicle emissions test facility in the UK to achieve certification for the Worldwide harmonised Light vehicles Test Procedure (WLTP) standard



1. Cost of sales: £219.2m
2. Administrative expenses net of other income: £98.2m
3. Net finance costs: £2.5m
4. Taxation: £7.4m
5. Profit after tax: £24.8m



**10,000**  
 McLaren Automotive celebrates the manufacture of its 10,000<sup>th</sup> car, all with a Ricardo-built engine



**Defence**  
 \$7.5m joint project to address persistent rollover issues related to the High Mobility Multipurpose Wheeled Vehicle (HMMWV)



**£42,000,000**  
 Resource efficiency savings achieved for Scottish small and medium-sized enterprises

# Order intake at a glance

Year ended 30 June 2017

Technical Consulting

Performance Products

79%

21%

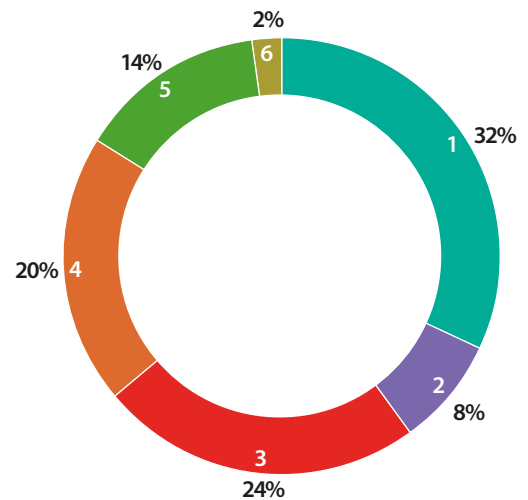
£366m

## Order intake by:

### Our market sectors

Our strategy of diversification into adjacent market sectors continues to provide balance to our order intake.

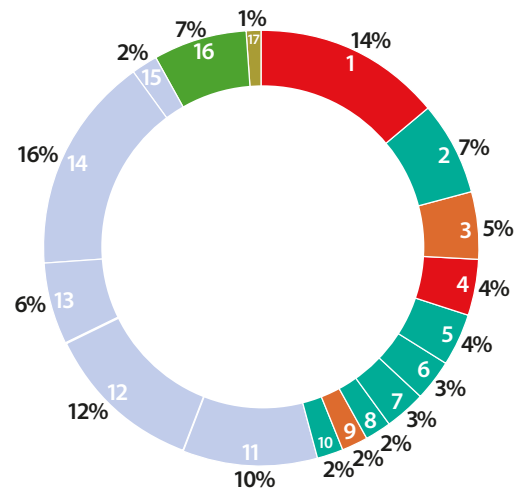
1. Automotive
2. Off-Highway & Commercial Vehicles
3. High-Performance Vehicles & Motorsport
4. Rail
5. Energy & Environment
6. Defence



### Our customers

Our order intake arises from a client list that includes the world's major transportation original equipment manufacturers and operators, supply chain organisations, energy companies, financial institutions and government agencies.

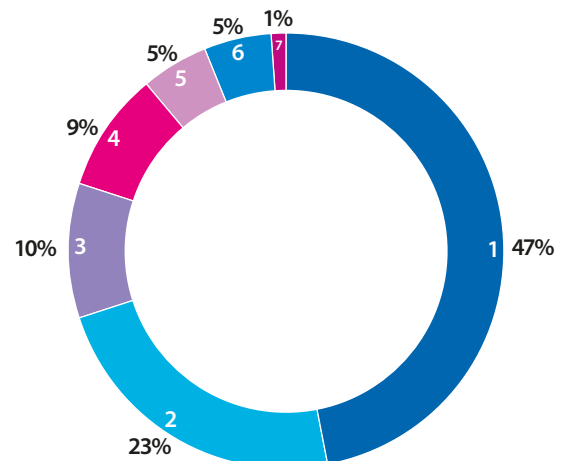
- 1-10. Key clients
11. Rest of UK
12. Rest of Europe
13. Rest of North America
14. Rest of Asia
15. Rest of the World
16. UK Government
17. US Defence



### Our geographies

The operations of the business in our selected market sectors span across different regions of the world.

1. UK
2. Mainland Europe
3. North America
4. China
5. Japan
6. Rest of Asia
7. Rest of the World

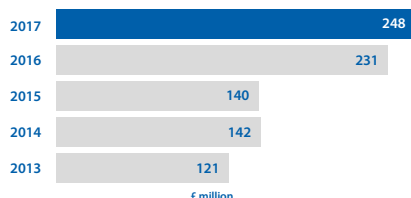




# Financial highlights

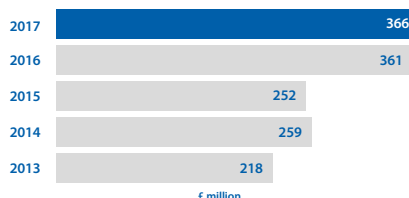
## Order book

**£248m** +7%



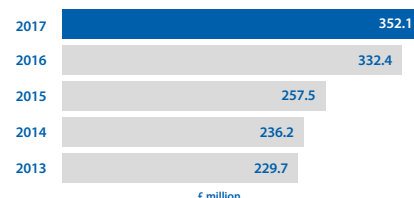
## Order intake

**£366m** +1%



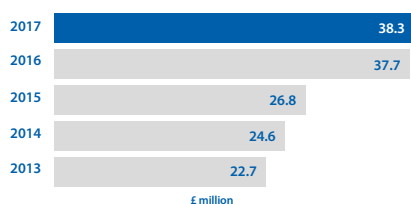
## Revenue

**£352.1m** +6%



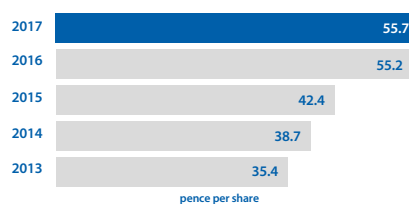
## Underlying<sup>(1)</sup> profit before tax

**£38.3m** +2%



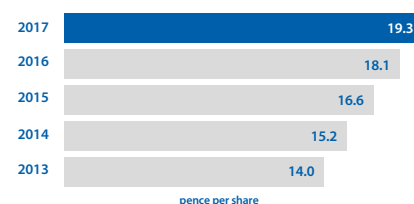
## Underlying<sup>(1)</sup> basic earnings per share

**55.7p** +1%



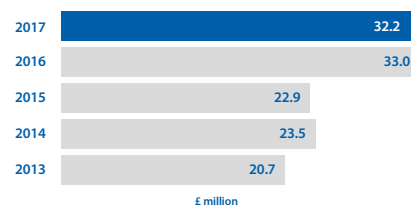
## Dividends per share (paid and proposed)

**19.3p** +7%



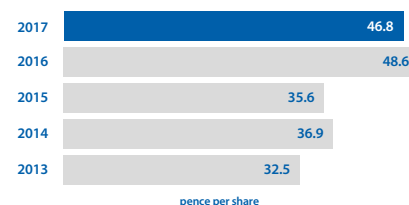
## Statutory profit before tax

**£32.2m** -2%



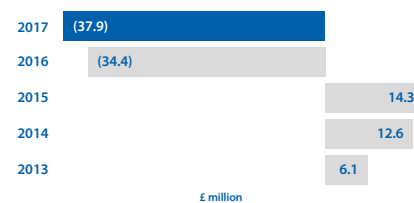
## Statutory basic earnings per share

**46.8p** -4%



## Net (debt)/funds

**£(37.9)m** -10%



(1) Excludes specific adjusting items, which comprise amortisation of acquired intangible assets of £4.0m (2016: £3.4m), acquisition-related expenditure of £1.7m (2016: £2.8m) and reorganisation costs of £0.4m (2016: £Nil). In the prior year, non-recurring income of £1.5m for claims under the Research & Development Expenditure Credit (RDEC) scheme was also included.

# Strategic report





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# Chairman's statement



Sir Terry Morgan, CBE - Chairman

The Group continues to pursue its strategic objectives through organic growth and carefully targeted acquisitions within Transport & Security, Energy, and Scarce Resources & Waste. Following the acquisition of Exnovo early in the year and Control Point Corporation after the year-end, I would like to welcome those employees to Ricardo.

## Results

For the year ended 30 June 2017, the Group delivered revenue of £352.1m and underlying profit before tax of £38.3m, together with an underlying basic earnings per share of 55.7 pence.

As set out in more detail in the Chief Executive's Statement on pages 8 to 10 and the Financial Review on pages 26 to 29, the Group has delivered a resilient set of results with marginal growth in underlying profit before tax and earnings per share. These results are positive in the context of an uncertain political and economic climate experienced in the year, together with the changes within the automotive industry, as many of our customers plan for an increasingly electrified future.

The strategy of the Group has been established on the need to have a diversified business, both geographically and across market sectors. It is through the implementation of this strategy in recent years that the Group has been able to deliver these results, with strong performance from our Rail and

Environmental consultancy businesses, together with our Performance Products business. After an unsettled start, the Group saw increasingly strong order intake as we progressed through the financial year, including electric and hybrid vehicles within our Automotive business, ending the year with a record order book overall for the Group.

The Group continues to pursue its strategic objectives through organic growth and carefully targeted acquisitions. The Group's performance against its strategic objectives is outlined on pages 14 and 15. We also continued to invest in research and development (as described on pages 24 and 25), our people and our facilities.

## People

I would like to thank all of our employees for their hard work and professionalism over the last year.

As set out on pages 30 and 31, Ricardo is a people business and our employees underpin everything that the Group achieves. We are extremely pleased



that one of Ricardo's highest performing employees, Angela Johnson, our Head of Knowledge & Technology Strategy, has been recognised in the inaugural *Autocar* list of the 100 most influential British women in the car industry.

Other notable achievements include Ricardo Certification being formally accredited by the United Kingdom Accreditation Service ('UKAS') to provide independent assurance services for the international rail sector. Ricardo Energy & Environment has been re-appointed as the UK's National Atmospheric Emissions Inventory ('NAEI') agency on behalf of the Department for Business, Energy & Industrial Strategy. In addition, Ricardo Performance Products has been nominated by Aston Martin to design, develop and supply an advanced transmission for the ground-breaking Valkyrie hypercar, which is being created as a result of a unique collaboration between Aston Martin and Red Bull Advanced Technologies. Finally, Ricardo Strategic Consulting has been named by Forbes among the leading management consultants in the United States. It is the commitment of our employees that enables us to deliver these results and which underpins our reputation with clients.

I would also like to congratulate all those individuals and team members who have won awards under the various Ricardo recognition programmes during the year, together with those members of staff who have gained academic success or peer group recognition in their chosen career paths.

### Corporate governance

The Board firmly believes that robust corporate governance and risk management are essential to maintain the stability of the Group and its financial health. I am reporting separately on Corporate Governance on pages 72 to 81 of this Annual Report.

### The Board

As announced on 24 April 2017, Ian Lee intends to step down as Non-Executive Director and Chair

of the Audit Committee at the close of our AGM in November 2017. I would like to thank Ian for his contribution to the Board, not only as Non-Executive Director, but also the guidance he brought as Chair of the Audit Committee. Bill Spencer has joined the Board as Non-Executive Director and it is intended that he will succeed Ian Lee as Chair of the Audit Committee with effect from the close of the AGM in November 2017. Bill has a wide range of experience in senior financial roles and I am confident that his experience will be of great benefit to Ricardo.

### Dividend

The Board has declared a final dividend of 13.88 pence per share to give a total dividend of 19.3 pence, an increase of 7% on the prior year. This is in line with the Board's policy to pay progressive dividends and reflects its confidence in the prospects of the Group.

### Outlook

The Ricardo strategy is underpinned by trends which will affect an ever-increasing number of people around the globe; with a growing population, mass urbanisation, poorer air quality, climate change, stringent emissions legislation and resource scarcity.

These long-term trends bring with them significant change, and Ricardo is a business that thrives on change. With a record order book and a good pipeline of opportunities across all sectors, the Group has the platform for future growth and to address these challenges as an increasingly diverse, balanced and global Automotive, Rail and Environmental consulting business.



**Sir Terry Morgan, CBE**  
Chairman



Displays and exhibits at the new Ricardo Centenary Innovation Centre



## Chief executive's statement



**Dave Shemmans - Chief Executive Officer**

I am pleased to report another solid year of progress for Ricardo, against a backdrop of significant political and market change. Based on the foundation of a diversified strategy and an increasingly balanced business, we have navigated an uncertain and volatile year, with parts of our business performing strongly, some less so, providing a satisfactory result overall.

### **Strategy**

Our strategy continues to be balanced around growth and risk mitigation – to capture the opportunities of global, societal and technological change, whilst ensuring risk mitigation, where possible, in anticipation of economic, industrial, customer and political cycles. We achieve this through carefully selected diversification to avoid any undue dependence on individual clients, markets or regions of the world. Our engineering and consulting businesses primarily in the markets of Automotive, Rail and Energy & Environment are all linked around common long-term trends, shared resources wherever possible, and serve shared customers in many cases. Our Performance Products business provides links to our other businesses in terms of products, but also provides a longer-cycle business that is measured in a decade of supply rather than a comparatively short-term engineering or consulting contract. A portfolio of businesses that have different cycles and longevity provides additional resilience.

We expand and adapt these businesses both through organic and acquisitive actions. Organic development is supported by investment in excellent people through our apprenticeship programmes, graduate recruitment, and industry hires and by investment into the right technologies and the right assets. In an ever changing environment we focus on being 'Agile, Adaptable and Ambitious' and we look for our team and assets to be capable of this philosophy: it is important for the business to be fluid.

Our strategy continues to be underpinned by long-term trends – population growth, urbanisation, energy security and efficiency, rising demand for natural resources and increasing environmental and emission regulations. All of these drive demand for innovative services and products. In many regions around the world, urbanisation is happening very rapidly and we are seeing significant infrastructure spend in the developing countries as they implement new rail-based transportation systems. This year we have also seen a significant focus on

emissions both at the local city level and in relation to the Paris Climate Agreement CO<sub>2</sub> reduction targets globally. These, together with the additional pressure brought by the intense diesel debate in the automotive industry, has led to an increased impetus around long-term electrification of vehicles, a short-term improvement of combustion engine performance and new ways of vehicle operation to enhance efficiency such as driverless or autonomous vehicles.

These global and strategic changes require new technologies, strategic oversight, programme management and certification – this is our heritage, and through our future-focused technology roadmapping, it is our business both today and tomorrow. Ricardo is well placed and benefits from global change. By looking forward and acting at the right time we adapt our footprint, technology investment, people skills and product mix.

Our process to enhance the future readiness of the business led us to invest in electric vehicle and hybrid technology a decade ago and to move into developing regions of the world early on: as a result, we already have the skills and connections to support our customers wherever they are with the solutions required today. As the pace in electrification and autonomous vehicles increases (across all forms of transportation), we will continue to be ready and will match our offerings and our asset base to the requirements of our customers.

Further information on the execution of our strategy can be found on pages 14 and 15.

## Highlights from the year

We closed the year with record order intake £366m and order book £248m, with good order intake contributions from all areas of our business and all core regions of the world. The Group saw growth in revenue of 6% to £352.1m (2016: £332.4m) and in underlying profit before tax of 2% to £38.3m (2016: £37.7m). Using exchange rates consistent with the prior year, revenue and underlying profit before tax would have been £336.9m and £38.2m, respectively, both of which represent growth of 1% on the prior year. Further details on the results for the year are provided in the Financial Review on pages 26 to 29.

Our Rail and Environmental consultancies delivered strong results at both revenue and operating profit levels, as did our Performance Products business. Within Performance Products we were pleased to deliver our 10,000<sup>th</sup> engine to McLaren and to be selected to design and produce an advanced hypercar transmission for Aston Martin.

Our Automotive business in Europe experienced a disrupted year of order flows which led to a less efficient business operation, as the industry digested and evaluated its product plans in reaction to developments such as the various referenda, elections, the diesel issue and the increased focus on electrification. The year ended with strong order intake in both the engines and electrification businesses and we are pleased to see a return to more normal order intake patterns in recent months as client plans are now more settled.

**Ricardo is collaborating on the design, development and manufacture of the transmission of the Aston Martin Valkyrie** (see case study 'Ultimate Performance' on pages 64 to 67)





Ricardo is providing Independent Safety Assessment ('ISA') services for the new fleet of driverless vehicles that will serve Beijing's Yanfang Line, the city's first automated metro line

With the US business underperforming, a changing customer dynamic and the increased emphasis on electrification, we are repositioning the US business to enhance our electrified and autonomous vehicle service offering, led from California where many new entrants are based. This involves some changes in team mix and regional emphasis, and asset reduction where appropriate.

We were also pleased to welcome Exnovo to the Ricardo Group early in the year, bringing with it core expertise in the motorcycle industry and a good base in Italy. Post year-end we completed the acquisition of Control Point Corporation. This business brings with it additional clients and expertise in the classified US defence sector.

At the heart of Ricardo's success is the ability of our staff to deliver excellence and create value for customers across industries. Some examples of excellent project delivery are presented in the Case Studies section between pages 42 and 67. Each of the case studies illustrates the skills, technical expertise, innovation and motivation of Ricardo's staff across the world:

- **Tackling nanoparticle emissions:** the emission of vehicle exhaust particles as small as just ten nanometres is an increasing concern around the world in terms of air quality and risk to public health. Ricardo is spearheading research into the measurement and control technologies, working with industry bodies and the European Commission;
- **Charge of innovation:** one of the major challenges holding back the market penetration of Battery Electric Vehicles ('BEVs') is the high cost of rechargeable energy storage. Ricardo is helping

## Chief executive's statement

to pave the way for a new, lighter-weight and safer lithium-sulfur based rechargeable battery chemistry that aims to overcome the cost, capacity and safety challenges of today's lithium-ion based systems;

- **Semi-autonomous semi truck:** the platooning of large vehicles represents the most attractive early application of automated driving. Ricardo engineers have developed platooning applications in some of the highest profile demonstration projects on either side of the Atlantic – and Ricardo has developed an enviable reputation as a leading innovator and technical partner for semi-autonomous vehicle platooning, reinforcing the Group's leadership position in the development of connected and autonomous vehicle technologies;
- **Shipping steers a clear course on emissions:** with pollutants and greenhouse gas emissions from shipping seen as a significant and growing part of global emissions, Ricardo has been commissioned to deliver a comprehensive update of the shipping emissions inventory for the UK National Atmospheric Emissions Inventory ('NAEI');
- **Smart monitoring:** Ricardo Rail has developed *PanMon*, an innovative pantograph monitoring system which helps operators improve the reliability of electrified routes and protect critical infrastructure. Network Rail has formally approved the use of *PanMon* for use across the whole UK national rail system – a highly significant step as *PanMon* remains the only such system certified for use by a major network operator; and
- **Ultimate performance:** Ricardo has been selected as technical and supply partner for the transmission of the Aston Martin Valkyrie – the ultra-high performance hypercar, itself the product of a partnership between Aston Martin and Formula One's Red Bull Racing.

## Outlook

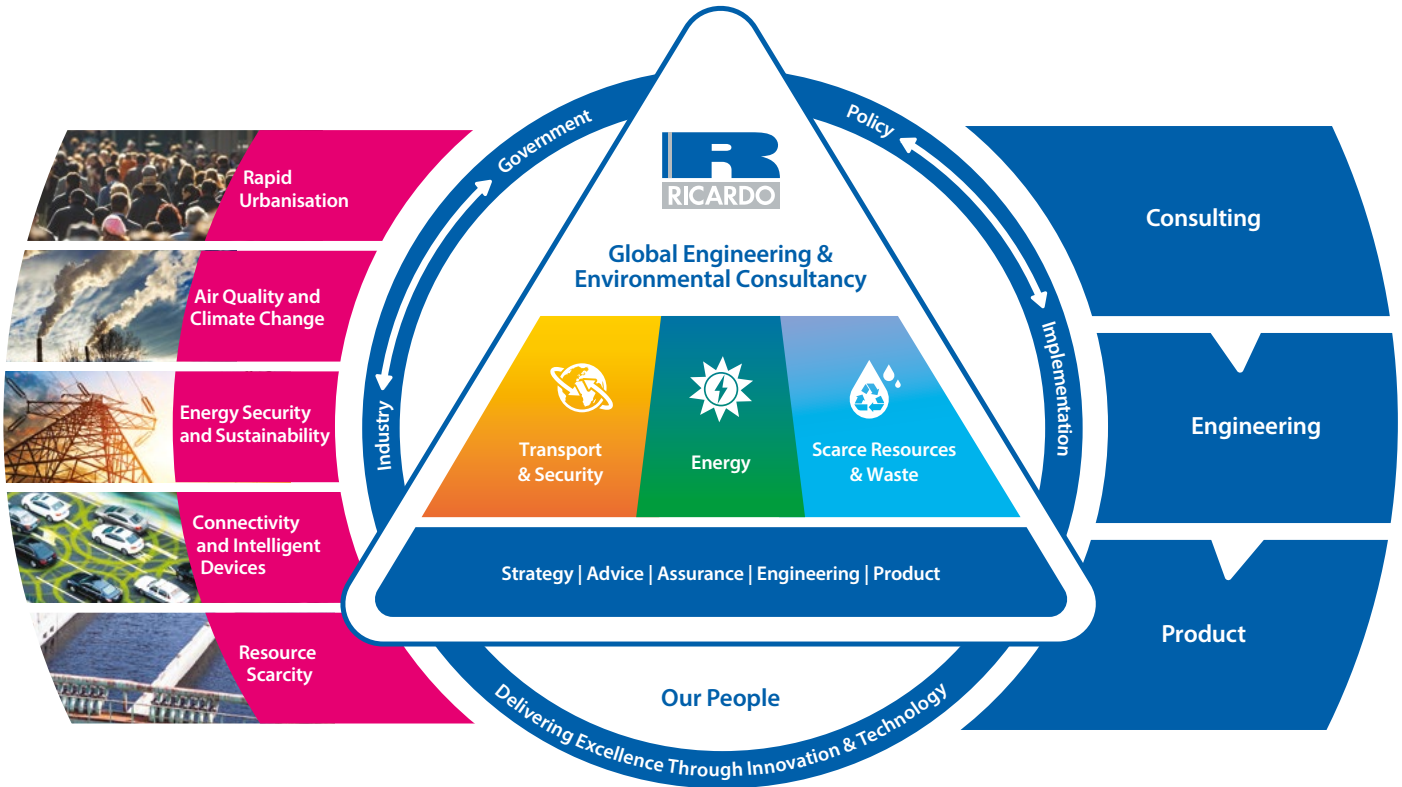
We enter the new financial year with a well balanced business and welcome the in-year acquisition of Exnovo and the recent Control Point Corporation acquisition post year-end. We continue to address and adjust to the changes in our individual markets to ensure we both mitigate risk and capitalise on the significant global opportunities which lie ahead. These opportunities, together with our progress, our people and our technology, in addition to our record order book, provide a good platform for further growth in the years to come.

**Dave Shemmans**  
Chief Executive Officer



# Our strategy

Our strategic mission is to be the world's leading organisation for engineering, technical and environmental consultancy within Transport & Security, Energy, and Scarce Resources & Waste.



See pages 8 and 9 for more information

## Our strategic objectives

### Performance growth

Profitable growth delivered by focusing on future market demands driven by technology change, customer needs and prevailing or impending policies and regulation

### Risk mitigation

Reducing risk through the avoidance of business cyclicality and external dependency, whether geographic, technical, industry sector or customer related

### World-class talent

Ensuring an environment which attracts, develops and motivates a diverse, world-class team and fosters industry thought leadership

### Operational excellence

Maintenance of an optimised cost base through an efficient global operation and the development of leading-edge tools, processes and capabilities to maximise value from our resources

### Added value for clients

Provision of in-demand products and services through our commitment to market-leading research, development and innovation to provide maximum and enduring benefits to customers

See pages 14 and 15 for more information

# Market overview

Mega trends



## Rapid urbanisation



## Air quality and climate change



## Energy security and sustainability

Market drivers

- Continuous development of autonomous and intelligent transport technologies driven by the need to improve vehicle safety and reduce death rates;
- Low Emission Zone initiatives, such as that operating in London, likely to be repeated in other cities; and
- Growth in high-speed and metro-based rail systems.

- Air quality identified as a key health concern: several cities are planning to ban diesel-powered vehicles, requiring increasing levels of urban air quality monitoring and management;
- International obligations for countries to manage and report greenhouse gas emission levels (COP22);
- UK, France, Germany and Norway planning to ban new, non-hybrid, light-duty vehicles from 2025 and 2040;
- Escalating fuel economy/CO<sub>2</sub> regulation in most developed countries (e.g. CAFE standard for 2025); and
- Significant shift to mass electrification of the passenger car fleet and the use of clean and renewable sources of electricity.

- Stricter emissions control and environmental regulations drive continued interest in alternative fuels, hybrid technologies and electrification;
- Continued focus on renewable energy options (wind, tidal, solar, and geothermal); and
- Decarbonisation of the energy sector and active carbon capture systems development.

Ricardo plc

- Working with cities and utilities on policy, optimisation, validation and integration of city systems;
- Recognised industry solution provider for vehicle electrification and urban mobility;
- Technology leadership in vehicle fuel economy – engine, driveline, whole vehicle, lightweight materials, powertrain electrification, battery electric vehicles, waste heat recovery, infrastructure, and autonomous vehicle systems;
- Provider of rail certification services in a number of countries; and
- Leader in the development of urban mobility, two- and three-wheeled solutions and e-bike capabilities.

- Respected international authority on urban air quality;
- Provision of air quality monitoring for cities;
- World leader in vehicle emissions development and aftertreatment technology;
- Successful and experienced developer of clean technologies across all transport sectors;
- World-leading expertise on the measurement, reporting and verification of climate mitigation and adaptation actions; and
- Technology leader in vehicle attributes development and vehicle fuel economy.

- Developer of patented intellectual property ('IP') focused on improved energy consumption and reliability of clean energy provision;
- Expertise in 'smart grids' and power distribution systems; and
- Expertise in natural gas and alternative fuels, energy storage and management.

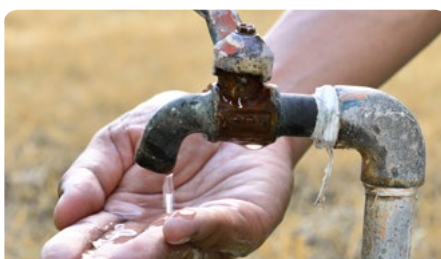




## Connectivity and intelligent devices

- Connectivity technologies being implemented to improve user experience and comfort will support development of connected public and personal mobility solutions (V2V and V2X);
- Increasing focus in the rail sector on 'intelligent rail', advanced signalling solutions and 'big data' for safety and asset optimisation;
- Growth of vehicle platooning and autonomous driving technologies in the commercial vehicles industry to improve safety and reduce cost of operations;
- Modernisation of defence platforms with next-generation technologies including cyber, intelligence gathering and defence electronics; and
- Proliferation of technology-enabled business models built around the concepts of 'on-demand services' and 'sharing economy'.

- Expertise and R&D in commercial vehicle platooning technology;
- Leading consultancy on the European Railway Traffic Management System ('ERTMS');
- Deep knowledge and expertise in consultancy services for the rail sector combined with industry-leading data optimisation and analytics capabilities;
- Provider of leading software solutions to the rail industry; and
- Capability in software development, controls and electronics for the automotive sector.



## Resource scarcity

- Growing middle classes and urbanisation placing increasing pressures on the supply of key resources;
- Water scarcity and competition between potable and industrial use starting to be recognised as a major future issue in many nations;
- Growth of 'circular economy'; and
- Growing need to reduce waste.

- Capability in water resource management, water quality, flooding and environmental impact assessment;
- Strategy, policy and technology roadmapping to support government and industry;
- Technology-agnostic, objective, informed and commercially independent provision of services; and
- Provider of bespoke software services for improved energy management to the water sector.



## Competitive landscape

All of the markets we operate in are highly competitive. Our competitors include engineering, environmental and strategy consultancies, as well as certification and assurance service providers and niche manufacturers.

Ricardo's Technical Consulting businesses primarily in the Automotive, Rail and Energy & Environment sectors compete with a small number of large consultancies operating at an international level, together with a larger number of small, specialised consultancies present in local markets.

Ricardo's Performance Products business competes with niche manufacturers and divisions of large automotive OEMs.

Our customers include governments and government organisations across a number of countries, inter-governmental and international financial organisations, and companies of different sizes. Ricardo's Automotive consulting business serves all the major OEMs in the Automotive sector as well as the increasing number of new entrants into the electric vehicle and autonomous segments of the market.

Ricardo's key differentiators are its leading technical, engineering, scientific and strategic capabilities, together with its technology and thought leadership. This is delivered by Ricardo's dedicated and talented team of people who are recognised for their expertise within the industries we serve. Ricardo also has a proven track record in the niche manufacture of high-quality and high-performance products.

# Strategic performance

The Board monitors performance indicators related to our strategic objectives

**Performance growth:** profitable growth delivered by focusing on future market demands driven by technology change, customer needs and prevailing or impending policies and regulation

More detail on these principal risks together with how they are mitigated is presented on pages 39 and 40

	Commentary	Principal risks								
<p><b>Revenue</b> £m</p> <table border="1"> <tr><th>Year</th><th>Revenue (£m)</th></tr> <tr><td>2017</td><td>352.1</td></tr> <tr><td>2016</td><td>332.4</td></tr> <tr><td>2015</td><td>257.5</td></tr> </table>	Year	Revenue (£m)	2017	352.1	2016	332.4	2015	257.5	<p>The increase in revenue is due to improvements in Technical Consulting activity primarily in Rail and Energy &amp; Environment, offset by a challenging financial year in Automotive across Europe and the US. Performance Products also saw increased activity as a result of growth in engine sales during the year. More details of this are described in the Financial Review section on pages 26 to 29, and also in the Technical Consulting and Performance Products sections on pages 16 to 21 and 22 to 23, respectively.</p>	<p><b>Contracts</b> <b>Customers and markets</b></p>
Year	Revenue (£m)									
2017	352.1									
2016	332.4									
2015	257.5									
<p><b>Order book</b> £m</p> <table border="1"> <tr><th>Year</th><th>Order book (£m)</th></tr> <tr><td>2017</td><td>248</td></tr> <tr><td>2016</td><td>231</td></tr> <tr><td>2015</td><td>140</td></tr> </table>	Year	Order book (£m)	2017	248	2016	231	2015	140	<p>After a disrupted flow of orders in the first half of the year, the order flow returned to normal patterns in the second half. The year-end order book was at another record level, with significant order intake from Rail, Automotive in Europe and Performance Products, in particular.</p>	<p><b>Customers and markets</b></p>
Year	Order book (£m)									
2017	248									
2016	231									
2015	140									
<p><b>Net (debt)/funds</b> £m</p> <table border="1"> <tr><th>Year</th><th>Net (debt)/funds (£m)</th></tr> <tr><td>2017</td><td>(37.9)</td></tr> <tr><td>2016</td><td>(34.4)</td></tr> <tr><td>2015</td><td>14.3</td></tr> </table>	Year	Net (debt)/funds (£m)	2017	(37.9)	2016	(34.4)	2015	14.3	<p>The Group has used net cash of £3.5m in the year, which includes £1.9m spent on acquisitions net of cash acquired, and £4.4m of acquisition-related payments. Working capital management remains a key focus for the Group.</p>	<p><b>Contracts</b> <b>Financing</b> <b>Defined benefit pension scheme</b></p>
Year	Net (debt)/funds (£m)									
2017	(37.9)									
2016	(34.4)									
2015	14.3									

**Risk mitigation:** reducing risk through the avoidance of business cyclicality and external dependency, whether geographic, technical, industry sector or customer related

	Commentary	Principal risks								
<p><b>Sector diversity</b> Number of sectors exceeding 10% of revenue</p> <table border="1"> <tr><th>Year</th><th>Number of sectors</th></tr> <tr><td>2017</td><td>5</td></tr> <tr><td>2016</td><td>5</td></tr> <tr><td>2015</td><td>3</td></tr> </table>	Year	Number of sectors	2017	5	2016	5	2015	3	<p>Five of our six sectors exceed 10% of revenue, demonstrating that the Group remains well diversified across all of its critical market sectors.</p>	<p><b>Customers and markets</b> <b>Technology</b></p>
Year	Number of sectors									
2017	5									
2016	5									
2015	3									
<p><b>Client dependency</b> Number of clients generating revenue exceeding 5% of Group revenue</p> <table border="1"> <tr><th>Year</th><th>Number of clients</th></tr> <tr><td>2017</td><td>2</td></tr> <tr><td>2016</td><td>3</td></tr> <tr><td>2015</td><td>4</td></tr> </table>	Year	Number of clients	2017	2	2016	3	2015	4	<p>The number of clients from whom revenue is generated that exceeds 5% of Group revenue has continued to reduce over the last three years. Whilst we retain a small number of key customers, we continue to have a diverse client base.</p>	<p><b>Customers and markets</b></p>
Year	Number of clients									
2017	2									
2016	3									
2015	4									

**World-class talent:** ensuring an environment which attracts, develops and motivates a diverse, world-class team and fosters industry thought leadership

	Commentary	Principal risks								
<p><b>Employee and knowledge retention</b> Voluntary employee turnover % per annum</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Voluntary employee turnover % per annum</th> </tr> </thead> <tbody> <tr> <td>2017</td> <td>14</td> </tr> <tr> <td>2016</td> <td>10</td> </tr> <tr> <td>2015</td> <td>15</td> </tr> </tbody> </table>	Year	Voluntary employee turnover % per annum	2017	14	2016	10	2015	15	<p>Employee turnover has increased due to increased activity in the labour market, as demand for engineers and scientists grows.</p>	<p><b>People</b></p>
Year	Voluntary employee turnover % per annum									
2017	14									
2016	10									
2015	15									

**Operational excellence:** maintenance of an optimised cost base through an efficient global operation and the development of leading-edge tools, processes and capabilities to maximise value from our resources

	Commentary	Principal risks								
<p><b>Underlying<sup>(1)</sup> operating profit margin</b> %</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Underlying operating profit margin %</th> </tr> </thead> <tbody> <tr> <td>2017</td> <td>11.6</td> </tr> <tr> <td>2016</td> <td>11.9<sup>(2)</sup></td> </tr> <tr> <td>2015</td> <td>10.8</td> </tr> </tbody> </table>	Year	Underlying operating profit margin %	2017	11.6	2016	11.9 <sup>(2)</sup>	2015	10.8	<p>The slight reduction in the Group's operating profit margin is driven principally by a disrupted year of order flows within the European Automotive sector of the Technical Consulting business, which led to a less efficient business operation. Financial performance is further described in the Financial Review from page 26.</p> <p>(1) Excluding specific adjusting items as described on page 3. (2) The prior year has been restated to include the impact of income from RDEC claims on a like-for-like basis with the current year.</p>	<p><b>Contracts</b> <b>Customers and markets</b></p>
Year	Underlying operating profit margin %									
2017	11.6									
2016	11.9 <sup>(2)</sup>									
2015	10.8									
<p><b>Environment</b> CO<sub>2</sub>e tonnes per employee for scope 1 and scope 2 emissions according to the reporting regulations</p> <table border="1"> <thead> <tr> <th>Year</th> <th>CO<sub>2</sub>e tonnes per employee</th> </tr> </thead> <tbody> <tr> <td>2017</td> <td>6.7</td> </tr> <tr> <td>2016</td> <td>8.4</td> </tr> <tr> <td>2015</td> <td>8.8</td> </tr> </tbody> </table>	Year	CO <sub>2</sub> e tonnes per employee	2017	6.7	2016	8.4	2015	8.8	<p>Scope 1 emissions vary based on project mix. We encourage improvements to reduce underlying emissions and improve effective use of resources on projects. Our emissions per employee decreased this year, partly as a result of the reduction in CO<sub>2</sub>e tonnes per kWh in UK electricity generation. This is due to a reduction in the UK's dependency on coal, together with a growing proportion of the UK's electricity being generated from renewable sources.</p>	<p><b>Compliance with laws and regulations</b></p>
Year	CO <sub>2</sub> e tonnes per employee									
2017	6.7									
2016	8.4									
2015	8.8									

**Added value for clients:** provision of in-demand products and services through our commitment to market-leading research, development and innovation to provide maximum and enduring benefits to customers

	Commentary	Principal risks								
<p><b>Technology development</b> R&amp;D spend (£m)</p> <table border="1"> <thead> <tr> <th>Year</th> <th>R&amp;D spend (£m)</th> </tr> </thead> <tbody> <tr> <td>2017</td> <td>9.5</td> </tr> <tr> <td>2016</td> <td>9.4</td> </tr> <tr> <td>2015</td> <td>9.8</td> </tr> </tbody> </table>	Year	R&D spend (£m)	2017	9.5	2016	9.4	2015	9.8	<p>R&amp;D spend was in line with our plans. The reported spend includes amounts capitalised in respect of development costs around the Group. The Ricardo Innovations Division drives rapid technology development and commercialisation. Further details of active projects are described on pages 24 and 25.</p>	<p><b>Technology</b> <b>Customers and markets</b></p>
Year	R&D spend (£m)									
2017	9.5									
2016	9.4									
2015	9.8									
<p><b>Customer satisfaction</b> Customer satisfaction ratings out of 10 across a range of measures</p> <table border="1"> <thead> <tr> <th>Year</th> <th>Customer satisfaction ratings out of 10</th> </tr> </thead> <tbody> <tr> <td>2017</td> <td>8.7</td> </tr> <tr> <td>2016</td> <td>8.6</td> </tr> <tr> <td>2015</td> <td>8.6</td> </tr> </tbody> </table>	Year	Customer satisfaction ratings out of 10	2017	8.7	2016	8.6	2015	8.6	<p>Customer satisfaction has remained strong at over 8 out of 10 during the past 12 months.</p>	<p><b>Contracts</b> <b>Customers and markets</b></p>
Year	Customer satisfaction ratings out of 10									
2017	8.7									
2016	8.6									
2015	8.6									



# Technical Consulting



## Performance

Ricardo's Technical Consulting activity accounts for around 80% of Group revenue and underlying operating profit primarily in the Automotive, Rail and Environmental consulting markets. We provide innovation-focused services in engineering, technical and strategic consulting, together with independent safety assurance services to private and public sector customers in the rail industry.

As set out in Note 2 to the financial statements, revenue has grown by 5% to £280.5m (2016: £267.9m) and underlying operating profit increased by 1% to £32.8m (2016: £32.5m), impacted by the underperformance of our US and European Automotive businesses, as noted in the Financial Review on pages 26 to 29. The underlying operating profit margin decreased to 11.7% (2016: 12.1%) due to a disrupted flow of orders which led to operational inefficiency. Order intake in the year stood at £288m (2016: £258m) and there has been a good balance of order intake within Technical Consulting across all core regions and with good levels of diversification across different market sectors. Highlights can be found on pages 18 to 21.

Growth in our Technical Consulting business continues to be underpinned by the following global trends:

- The reduction of carbon dioxide emissions, supported by agreements reached at COP21 and COP22, and the elimination of the release of noxious pollutants and particulates;
- Improvements in the efficient use of energy and increasing diversification of the global energy mix;
- The rise of global connectivity, the increase of connected devices in the commercial and industrial sectors and their safety case;
- Electrification and automation of vehicles and transport systems; and
- Increasing levels of urbanisation and resource scarcity.

This year the Automotive business has had mixed performances.

The Automotive EMEA<sup>(1)</sup> Division, which includes Ricardo's Automotive businesses across Europe and certain regions of Asia, including India, Japan and South Korea, remains the largest business in terms of profit generation.

The division secured a range of large, multi-year programmes in the Automotive and Off-Highway & Commercial Vehicles sectors and across many regions during the year. We are particularly pleased that over 15% of the order intake in the year within Technical Consulting was in connection with vehicle electrification programmes (17% for the total Group). Although activity has remained at a good level across all

(1) Formerly the European Technical Consulting ('EUTC') Division





Named as one of 'Wards 10 Best Engines of 2017', the four-cylinder 2.3L Turbocharged DOHC engine of the Focus RS was developed in an engineering partnership between Ford Performance and Ricardo

around platooning technologies, and in autonomous vehicle and connected car technologies and their safety cases. Our expertise in these areas provides a solid foundation for the future success of Ricardo's US business and we continue to develop our presence in Silicon Valley to service the new automotive clients in California.

China remains a key market for the Technical Consulting business and this year we secured a number of contracts in the Automotive sector, some of which are being delivered locally through our technical centres in Shanghai and Beijing. These contracts have included a mixture of work for hybrid vehicles, engines and transmissions.

In the motorcycle and urban mobility business, through two recent acquisitions, Ricardo Motorcycle has created a unique complete motorcycle engineering offering. Our projects in this area encompass styling and concept development, through to detailed design, engineering, prototype testing and industrialisation.

We have completed the integration of the Rail business into Ricardo and Ricardo Rail has closed the financial year with its highest ever order book. The business is well positioned to take advantage of positive trends within the global rail market, where we continue to see solid growth.

Ricardo Energy & Environment has continued to grow its base of

international and private sector clients. Our air quality team has delivered innovative projects, such as the implementation of new technology to monitor driving emissions at the roadside, both in the UK and internationally, and we have expanded the offer of our services to a number of infrastructure businesses outside the water and energy practice areas.

In the Defence sector, Ricardo Defense Systems has won a number of new contracts primarily in land defence, including further contracts to develop safety of the US Army's iconic High Mobility Multipurpose Wheeled Vehicle ('HMMWV').

Ricardo's Strategic Consulting business continues to operate well across all geographies. Our teams' multi-industry knowledge, deep technical expertise and management consulting skills offer a unique proposition to customers in the sectors that we serve.

### Business model

We provide engineering, technical and environmental consulting services, together with accreditation and independent assurance services to the rail industry. Our services are typically delivered on a fixed-price basis for a scope of work which is specific to our clients' needs; our projects have defined deliverables and range in length from projects which last a few weeks or months to programmes that extend over several years.

Management of projects, resources and customers are key skills to enable efficient delivery of our services. Our capabilities are based on the application of intellectual property, know-how and knowledge developed through our investment in research and development ('R&D') and our participation in collaborative R&D programmes in several industries and geographies, as well as on the expertise of our staff. These capabilities are complemented by a wide range of design, test and development tools and equipment.

People are at the heart of Ricardo's Technical Consulting business and we have a balance of experienced professional engineers, scientists and

engineering disciplines, with increasing demand for powertrain application, calibration, electrical and electronics skills, many of our customers did delay or put programmes on hold because of the uncertainty following the UK referendum vote to leave the European Union, together with the US election.

Trading in the Automotive US business was challenging, where solid levels of activity in the Commercial Vehicles business, driven by new legislation requiring in-use compliance testing, did not compensate for the reduced levels of work we saw primarily in the Detroit region. This was due to the Detroit automakers consolidating to fewer powertrain platforms whilst at the same time increasing in-house test facilities and resources. We believe that longer term growth opportunities exist in the Commercial Vehicles business, especially



## Technical Consulting

Ricardo provided quality assurance and test management services, together with Reliability, Availability, Maintainability and Safety ('RAMS') analysis for the Amsterdam North-South metro line – due to open in 2018



economists, along with a thriving and increasingly diverse graduate and apprenticeship recruitment programme.

Our staff includes specialists in electronics, software and control strategy, mechanical and electrical design, test and development, vehicle attribute development, prototype build, programme management, independent assurance, signalling, critical system design and development, cost estimation, atmospheric pollutant modelling, environmental science and environmental economics.

Our global infrastructure helps us to meet the needs of our customers. Ricardo now has 53 sites in 21 countries, with technical centres in the US, UK, Netherlands, Germany, Italy, Czech Republic and China supported by offices where a local presence is needed to service our customers. Engineers from the technical centres are deployed on

projects across the globe using common engineering processes.

Our Energy & Environment consulting services are delivered mainly from the UK but the business is making increasing use of Ricardo's global network in support of its growth objectives. Ricardo's Rail and Strategic Consulting businesses have global teams operating from a number of different locations.

### Market sector highlights Automotive

The Automotive sector remains the most significant for Ricardo.

CO<sub>2</sub> reduction is a top global priority for this sector and is being driven strongly by consumers. Additionally, the increased focus on air quality and, in particular, NO<sub>2</sub> emissions, is resulting in demand for all aspects of vehicle electrification, from mild hybrids to full battery electric vehicles

('EVs'). Projections suggest that 30% of all new passenger cars will have electric powertrains (including hybrids and EVs) by 2025.

We have secured a range of programmes in vehicle systems, hybrid and electric systems, advanced driveline, and in the core powertrain areas of our business, focused on both new and existing product upgrades.

We have developed *R-Intelect* ('Integrated Electrification'); an integrated approach to electrified vehicle development which combines a focus upon functional systems engineering, together with the application of an integrated model-based development toolset. We continue to invest in advanced combustion and transmission solutions and other key technologies in areas related to improvements in overall vehicle efficiency such as lightweighting, intelligent driveline and vehicle electrification.





With the Ricardo Motorcycle business, we now have the capability to deliver for our customers the full development of motorcycles, scooters and urban mobility vehicles, including their powertrains.

We see growth in this market driven by tightening emissions legislation, along with consumer demand for higher capacity motorcycles in developing markets.

### Rail

Ricardo Rail delivered a strong performance throughout the year and reported a record year-end order book. The business is also well positioned to take advantage of positive trends within the global rail market, namely high levels of new-build activity and the opening up of a once notoriously parochial sector, both of which are leading to the development of an increasingly globalised supply chain. This is particularly notable in our relationships with major international rolling stock manufacturers such as Hitachi Rail and CRRC, where our established presence in their domestic markets has led to our involvement supporting the introduction of their vehicles into the European, North American and Australasian markets.

This year we set up a rail product development team to exploit opportunities for new technologies within the sector, particularly in the area of asset optimisation. For example, Ricardo Rail's pantograph condition monitoring system, *PanMon*, which has recently been approved for use across the UK main line. The Belgian state railway operator, InfraBel, is also currently trialling the system, with a view to an eventual certification for its own network. See case study on pages 60 to 63.

### Ricardo Certification

Since achieving accreditation and to the date of this report, Ricardo Certification has issued:

- Over 30 Safety Assessment Reports as an Assessment Body under the EU Common Safety Method Risk Assessment and Evaluation Regulations, principally from the UK, Netherlands, Denmark and Spain;



The future of mobility solutions, including connected and autonomous vehicle technology in particular, is attracting significant interest in North America, along with the associated challenges of the regulatory environment, safety, assurance and cyber security of autonomous vehicles. Interest in hybrid and electric vehicle

architectures, battery pack and battery management system design and vehicle attribute development also feature strongly as OEMs increasingly look to accelerate the launch of Plug-in Hybrid Electric Vehicles ('PHEVs') and Battery Electric Vehicles ('BEVs') based on existing vehicle platforms and also, increasingly, dedicated hybrid powertrains.



## Technical Consulting

- Over 80 certificates as a Notified Body or Designated Body under national regulations that satisfy the requirements of the EU Interoperability Directive, principally from the UK, Netherlands, Denmark and Spain;
- Over 50 Accredited Independent Safety Assessment ('ISA') reports, principally from Spain and China; and
- Over 50 Railway Product Certifications, all from China.

Furthermore, an extension to the scope of accreditation has been granted for the delivery of Assessment Body services for On-track Plant and Engineering Change of Rail Vehicles according to RIS1710 and RIS2700, respectively.

### Energy & Environment

Ricardo Energy & Environment has continued to deliver leading work in global climate change, supporting governments across the world, including Rwanda, India, Nigeria and Thailand, with the development and implementation of their climate commitments. For example, in Nigeria, Ricardo Energy & Environment has advised the Federal Ministry of Environment on how to take forward its Nationally Determined Contribution ('NDC') climate action plan under the Paris Agreement, and the team of national and international experts has supported the development of sectoral action for the power, transport, agricultural and oil and gas industries.



**Emelia Holdaway (centre), International Climate Change Policy Manager for Ricardo Energy & Environment, joins the expert panel on the role of adaptation planning at COP22 in Marrakech**

We have also seen high demand for our services in the area of air quality, in which Ricardo Energy & Environment has demonstrated its innovation capabilities. This is highlighted in the unique approach established for the collection of marine emission data on a national scale and the implementation of new technology in monitoring real-world driving emissions at the roadside.

The extensive breadth and depth of expertise within our energy and water practices has contributed to increased private sector sales, helping to bring these into balance with the

traditional public sector portfolio. Demand has also increased for cross-discipline environmental services from infrastructure-focused customers beyond water and energy, such as airports. We believe this trend will continue, driven by requirements for compliance with global regulations and more sustainable business growth.

In the renewable energy business our strategic consulting team is delivering another substantial programme to improve manufacturing output, efficiency and quality for a world-leading wind turbine manufacturer.



**A Ricardo-run climate change commitments workshop for Rwanda's Government ministries**

### Off-Highway & Commercial Vehicles

We have seen growth and secured a number of large engine and transmission projects across the medium- and heavy-duty sectors. We continue to see interest across Asia, in particular, for Ricardo's capabilities in the Commercial Vehicles business. The order pipeline is based around a broad mix of largely engine and transmission opportunities. In the US, greenhouse gas and low NOx standards are driving interest in powertrain and trailer efficiency, emissions control and the use of alternative fuels. Commercial vehicle platooning is also a fast-growing area of opportunity.



Strong engagement in this sector has driven increased engine test activity – especially in North America, where new regulations requiring in-use compliance are now creating significant demand for powertrain testing and analysis. We have also seen growing interest in our fuel cell capabilities at our technical facility in California. We have focused on developing our product offering in the areas of ultra-low emissions, fuel economy improvement, system optimisation, platooning and hybridisation: we see all these as areas of significant future growth.

In the Off-Highway business, activity remains at a relatively low level in Europe following the recent implementation of Stage IV emissions standards, while in Asia the industry is showing renewed growth, especially in the transmission and driveline area; Ricardo is securing an increasing number of projects, including large multi-year programmes. Our focus in the coming years will be on assisting clients to meet EU, US and Asian emissions regulations and 2020 emissions targets, together with the introduction of new technologies for efficiency improvements.

We see increasing demand for high-speed diesel generator sets and main propulsion systems for marine vessels, and for the conversion of engines for gas or dual fuel operation. The majority of our activities in this industry have been based around failure analysis, investigations, specialist design and development.

### Defence

In the US, the Ricardo Defense Systems business has won a number of new contracts, mainly in the land domain, and is focused on growth into new areas of the US defence market.

In the UK, we have grown our marine defence business, both surface and sub-surface. In Europe and Asia we have secured contracts to deliver new engine and transmission designs for land vehicles and are pursuing other large opportunities.

### Outlook

We end the financial year with a good order book across all regions and sectors. This gives us confidence in future revenue and profit growth as we continue to seek diversified opportunities in our three core growth areas of Transport & Security, Energy, and Scarce Resources & Waste, whilst exploiting the breadth of our skill set and global footprint.



Toyota's 'Project Portal' is designing a heavy-duty hydrogen fuel cell system for class 8 truck use at the ports of Los Angeles and Long Beach, California. Ricardo provided technical assistance to the project, including areas of design, vehicle build, testing and development, and is currently supporting vehicle trials



# Performance Products



## Performance

The Performance Products business accounts for around 20% of Group revenue, with a large proportion of that revenue generated through the supply of products and services to a single customer.

As set out in Note 2 to the financial statements, revenue increased by 11% to £71.6m (2016: £64.5m) and underlying operating profit increased by 13% to £8.0m (2016: £7.1m). Operating profit margins were also up slightly to 11.2% (2016: 11.0%). Profit performance was higher than the prior year, primarily due to increased volumes in respect of the

engine supply contract for McLaren and the start of production of transmissions for the Bugatti Chiron. Order intake in the year stood at £78m (2016: £103m), which was lower than last year when we secured a multi-year transmission supply contract.

The Performance Products business continues to focus on the development of long-term strategic relationships with customers, and the consistent achievement of high product quality and

on-time delivery to win new and large contracts.

Further details of activities within the year can be found within the market sector highlights on page 23.

## Business model

We manufacture and assemble low-volume, high-quality prototypes and niche volumes of complex engine, transmission and vehicle products which have either been designed by the Technical



2016 European Le Mans Series ('ELMS') Championship winner, Jota Motorsport, featuring a Ricardo transmission



Ricardo Performance Products has commenced production of the transmission for the Bugatti Chiron



and also gives us an advantage over our competitors. High customer satisfaction means that our programmes can extend over many years and several of our larger programmes include agreements for the supply of spare parts and other support services.

The Performance Products business also includes the activities of the Ricardo Software Division, which develops and commercialises a wide range of computer-aided engineering ('CAE') software products for virtual engineering in the automotive, water and renewable energy industries. Ricardo's CAE products are licensed and supported globally by staff in Europe, North America and Asia, and in select regions via channel partners. We have also established partnerships with companies like Modelon to bring new software products to market.

### Market sector highlights High-Performance Vehicles & Motorsport

The new expanded engine assembly facility is now fully operational, doubling capacity and generating the capability to deal with an increased number of engine variants. Production of engines for the McLaren 540C, 570S, 570GT, 675LT and the McLaren P1™ GTR hypercar continued during the year in line with expectations, and full production of engines for the new 720S has been added. We also secured the transmission supply contract for the Aston Martin Red Bull Valkyrie hypercar, whilst continuing to support Bugatti with supply of the complete driveline system for the Chiron.

Ricardo remains a key supplier to the motorsport sector. Ricardo is now supporting a key manufacturer within the Formula E Championship with a collaboratively designed and tested product. We continue to manufacture for Formula One, and we supply products such as the Ricardo-designed transmissions for BMW and Multimatic (for Ford) GT3 programmes, the M-Sport World Rally Championship Ford Fiesta, the Hyundai R5 Rally programme, the Japanese Super Formula Championship, Indy Lights and the World Series Formula V8 3.5.

### Defence

Ricardo continues to supply spare parts to the UK Ministry of Defence ('MOD') to support the Cougar and Weapons Mount Installation Kit ('WMIK') vehicle fleets. Ricardo Defense Systems and Lightweight Innovations For Tomorrow ('LIFT'), a Manufacturing USA institute, are working together to identify and deploy a new, robust and reliable solution to documented braking and stability problems in the current High Mobility Multipurpose Wheeled Vehicle ('HMMWV') configuration.

### Outlook

We have a significant pipeline of new opportunities, which gives us confidence in the continued growth of the Performance Products business – and which further demonstrates the value that our advanced production and manufacturing techniques can deliver to customers operating in a range of market sectors and geographies.

Consulting side of our business, by our motorsport products design team within Performance Products, or by our clients.

We manage the complete supply chain and earn revenue either for the products that we supply or for the manufacturing or assembly services that we provide.

Our productive resources are centred on a highly flexible transmissions manufacturing facility at our Midlands Technical Centre and an engine assembly facility based at our Shoreham Technical Centre. To service our clients we also have a global support network with technical and engineering centres in the US, UK, Netherlands, Germany, Italy, Czech Republic and China.

The products and services that we supply are critical for our customers. The key skills to deliver these products and services include: product design and development, production and operations management, supply chain management and customer management. Ricardo's manufacturing know-how and ability to manage low-volume production and assembly complements and adds value to our customers' in-house capabilities



# Research and Development



Mark Garrett - Chief Operating Officer

Our continued investment into R&D as a means to bring value-added technology-based solutions to our clients remains at the heart of our organisation. Our diverse business needs are supported through a range of self-funded and collaborative programmes, aligned with the enduring drivers of our markets. Our focus on timely and cost-effective solutions for both products and processes is creating value both for Ricardo and our clients.

As global specialists in Transport & Security, Energy, and Scarce Resources & Waste, Ricardo has an extensive R&D portfolio. The portfolio covers a variety of surface transportation sectors, such as Automotive, Commercial Vehicles, High-Performance Vehicles & Motorsport and Rail, and our research is well aligned with our customers' future needs.

R&D projects include developing next-generation components for electrified vehicles, including electric motors and inverters, and delivering a framework for automotive cyber security through assurance. This project will address the increased threat from cyber attacks with the proliferation of connected and automated road vehicles, with the objective of developing a 5-star type consumer rating framework analogous to existing Euro NCAP safety ratings.

The key technical achievements delivered this year are:



- Completing a full demo vehicle for the ADEPT 48V diesel hybrid passenger car technology demonstration project. The current cost analysis shows an on-cost of €60 per g/km CO<sub>2</sub>, which is better than current full hybrid solutions;
- Designing the next-generation small electric motor ('e-motor') with a very high output, which is aligned with our

electric powertrain strategy. The next-generation electric motor strategies and requirements are under development with a European OEM research consortium. Ricardo has been challenged to develop an electric motor with approximately 50% increased peak power density compared to first generation products. The design is an electric motor sized at



around 25 kW, and inverter for 48V applications. The 48V system is targeted to be less costly than high voltage systems for small to medium-sized passenger car applications;

- Completing the design, build, test and evaluation of a new lithium-sulfur battery chemistry, and developing an improved Ricardo battery management system targeting R&D applications;
- Manufacturing a lightweight differential rear-wheel drive unit prototype. The ultra-lightweight prototype is 24% lighter than a current production unit and considerably more compact. The research project demonstrates Ricardo's lightweighting expertise for tackling future driveline challenges including the integration of e-machines;
- Concluding the initial testing for the CryoPower programme, which demonstrated the potential for circa 60% brake thermal efficiencies for heavy-duty and large engine applications; this technology injects a cryogen to decarbonise heavy-duty power;
- Progressing the next-generation direct injection gasoline engine programme. Test results demonstrate fuel consumption benefits in the range of 12-16%. The on-cost of less than €20 per g/km CO<sub>2</sub> is competitive with other technologies; and
- Generating real-time data using the *SensorLife*<sup>™</sup> condition monitoring system, analysing wind turbine drivetrain health on installed demonstration units of Ricardo's *MultiLife*<sup>™</sup> bearing system. The real-time data is validating a predicted 500% improvement in bearing life. The demonstration unit is a 600 kW active wind turbine operated by ScottishPower.

### Active improvement projects

Ricardo continually invests in its own techniques and processes to ensure that Ricardo's engineering capabilities are relevant and customer-focused. We invest in collaborative projects funded through European and UK technology boards. Key projects this year include:



- **Automotive Cyber Security through Assurance project ('5\*StarS')**: the project will address the increased threat from cyber attacks with the proliferation of connected and autonomous road vehicles;
- **Lean Gasoline Emissions Aftertreatment ('LEAN-G')**: identifying the next possible lean gasoline vehicle aftertreatment solutions based on the latest emissions legislation from Europe and the US via a V-SIM model based simulation;
- **Validating Intelligently Through Accelerated Life ('VITAL')**: a project that aims to develop a software toolset that can quickly produce efficient design validation plans to meet increased reliability expectations from customers; and
- **Diesel Engine NOx Aftertreatment ('ULTRA LOW NOx')**: aims to develop a base engine methodology to achieve a 90% reduction in tailpipe nitrogen oxides ('NOx') compared to current legislation for on-highway trucks.

We continue to build our academic links through university collaboration in order to extend our capability to develop customer-centric solutions. Ricardo and the University of Sheffield's Advanced Manufacturing Research Centre ('AMRC') have entered into a Memorandum of Understanding targeting powertrain electrification projects. Target areas are advanced manufacturing projects for electric vehicle components and systems.

# Financial review



Ian Gibson - Chief Financial Officer

During the financial year the Group has navigated its way through an unsettled political climate and a period of substantial change in the marketplace. The diversification of the Group across multiple sectors and geographies has enabled it to meet these challenges and deliver a set of results with marginal growth in underlying profit. We start the next financial year with another record order book that has grown organically by 7% to £248m and we look forward to the opportunities in the year ahead.

## GROUP RESULTS

The Group has delivered an underlying operating result which is in line with expectations for the year ended 30 June 2017. Total Group revenues increased to £352.1m, representing a 6% increase on the prior year (2016: £332.4m). Underlying profit before tax, which excludes specific adjusting items as set out in more detail in Note 4 to the financial statements, increased by 2% to £38.3m (2016: £37.7m), with the margin reducing slightly to 10.9% from 11.3% in the prior year. Using exchange rates consistent with the prior year, revenue and underlying profit before tax would have been £336.9m and £38.2m, respectively, both of which represent growth of 1% on the prior year. This growth in underlying profit before tax includes an additional £0.1m from the performance of acquisitions on a like-for-like basis with the prior year.

## Headline Group performance

	2017	2016
Order book	<b>£248m</b>	£231m
Order intake	<b>£366m</b>	£361m
Revenue	<b>£352.1m</b>	£332.4m
Underlying <sup>(1)</sup> profit before tax	<b>£38.3m</b>	£37.7m
Statutory profit before tax	<b>£32.2m</b>	£33.0m
Underlying <sup>(1)</sup> basic earnings per share	<b>55.7p</b>	55.2p
Statutory basic earnings per share	<b>46.8p</b>	48.6p
Net debt	<b>£(37.9)m</b>	£(34.4)m

(1) Excludes specific adjusting items, which comprise amortisation of acquired intangible assets of £4.0m (2016: £3.4m), net acquisition-related expenditure of £1.7m (2016: £2.8m) and reorganisation costs of £0.4m (2016: £Nil). In the prior year, non-recurring income of £1.5m for claims under the Research & Development Expenditure Credit ("RDEC") scheme was also included.

The financial year ended with another record closing order book of £248m (2016: £231m), which is a 7% increase on the prior year. Our order book comprises the value of all unworked purchase orders received. The closing order book, together with a very good pipeline

of further opportunities, continues to represent a diversified spread of orders across market sectors, customers and geographies.

Reported profit before tax for the year decreased by 2% to £32.2m (2016: £33.0m). The decrease is primarily



as a result of a £0.6m increase in the amortisation charge on acquired intangible assets, reorganisation costs of £0.4m and a £0.7m increase in net interest payable on borrowings, together with a net reduction in income from claims under the Research & Development Expenditure Credit ('RDEC') scheme of £0.3m. This movement is partially offset by a £1.1m decrease in net acquisition-related expenditure and £0.1m of profit generated from acquisitions on a like-for-like basis with the prior year.

The Group results include the acquisition completed during the year of Motorcycle Engineering Italia s.r.l., which was formed from the operating assets and employees of Exnovo s.r.l., a vehicle design house which creates class-leading aesthetics for global motorcycle and scooter brands. This business was subsequently renamed Ricardo Motorcycle Italia s.r.l. The performance of the acquired entity has been reported in the Technical Consulting segment (see Note 12 to the financial statements on page 135).

## SEGMENTAL RESULTS

The segmental results for the Group's operating segments are set out above.

### Technical Consulting results

Segmental operating results for Technical Consulting are discussed on pages 16 to 17. Technical Consulting had revenues and underlying operating profits of £280.5m (2016: £267.9m) and £32.8m (2016: £32.5m), respectively, with marginal growth in profit on the prior year.

Our businesses in the Automotive and Commercial Vehicles sectors in Europe experienced a disrupted flow of orders in the year as customers evaluated their product plans in light of the unsettled political climate and change within the industry. This was particularly evident in the first half of the year. In the second half, we saw order flow return to normal patterns with orders at the end of the financial year being slightly ahead of the prior year. This led to a less efficient business operation during the year, impacting margins during the period of

## Segmental results

	Technical Consulting £m	Performance Products £m	Total £m
Revenue			
FY 2016/17	280.5	71.6	352.1
FY 2015/16	267.9	64.5	332.4
<b>Growth</b>	<b>5%</b>	<b>11%</b>	<b>6%</b>
<b>Underlying operating profit</b>			
FY 2016/17	32.8	8.0	40.8
FY 2015/16	32.5	7.1	39.6
<b>Growth</b>	<b>1%</b>	<b>13%</b>	<b>3%</b>

disrupted order flow. With a good order book at the end of the year the business is in a good position to grow.

Elsewhere in the Automotive and Commercial Vehicles sectors, the business in Asia has become a more profitable operation than it was in the prior year and continues to make good progress. However, the market in Detroit remains challenging and our US business ended the year with a loss. Order intake has been below historical levels in recent years and we are taking steps to reposition the business and enhance our electrification and autonomous service offering.

The Rail business is now completely integrated with the rest of the Group and has performed well, with strong order intake in the year from a wide geographical spread of customers. Rail's revenue and operating profit reported in the year also benefited from favourable foreign exchange translation.

The Energy & Environment business also had a good year, with good levels of growth in revenue and profitability across its practice areas. The business has extended its order book heading into the new financial year by winning a number of multi-year orders for UK Government programmes, whilst also continuing to broaden its customer base in the private sector.

### Performance Products results

Segmental operating results for Performance Products are discussed on page 22. Performance Products had a strong year, as revenues increased on the prior year by 11% to £71.6m (2016: £64.5m) and underlying operating

profits increased on the prior year by 13% to £8.0m (2016: £7.1m). The current year performance was driven principally by increased volumes of engines in respect of the contract for McLaren, together with increased transmissions for both Bugatti and Porsche. This has been partially offset by lower application engineering work than the prior year within the Software business.

### Basis of preparation

The financial statements have been prepared in accordance with International Financial Reporting Standards ('IFRS') and International Financial Reporting Standards Interpretations Committee ('IFRS IC') interpretations adopted by the European Union ('EU') and the Companies Act 2006 applicable to companies reporting under IFRS. The Group's principal accounting policies are detailed in Note 1 to the financial statements on pages 122 to 127. Those accounting policies that have been identified as being particularly sensitive to complex or subjective judgements or estimates are disclosed in Note 1(c) to the financial statements on pages 122 and 123.

We have also commenced work to assess the potential impact of IFRS 15 'Revenue from contracts with customers', which becomes applicable to the Group for the year ending 30 June 2019. Whilst a more detailed exercise has yet to be performed, our current expectations arising from an initial assessment of the new standard, as set out in Note 1(x) to the financial statements, is that the impact on revenue recognition is unlikely to be material.

## Acquisitions and acquisition-related intangible assets

As set out in more detail in Note 12 to the financial statements, the Group acquired the entire issued share capital of Motorcycle Engineering Italia s.r.l. on 29 July 2016, a business that was formed from the operating assets and employees of Exnovo s.r.l., for consideration of £1.9m (€2.2m).

This investment added goodwill of £3.2m to the Ricardo Motorcycle cash-generating unit which, as set out in more detail in Note 13 to the financial statements, has subsequently been reallocated as a result of the integration of the Motorcycle business into Automotive EMEA (formerly Europe Technical Consulting). Acquisition-related intangible assets have also been identified, with a net book value at year-end of £0.2m.

An exercise to assess the fair value of the identifiable net assets as a result of this acquisition has been completed during the year. In addition, the preliminary assessment made in the prior year of the provisional fair value of identifiable net assets in respect of the Chinese joint venture operation acquired from the Lloyd's Register Group on 1 March 2016 has been finalised during the year, which added £0.2m of goodwill to the Ricardo Rail cash-generating unit. Total goodwill at 30 June 2017 is £62.0m (2016: £57.0m), which includes retranslation of goodwill denominated in foreign currencies of £1.6m.

Amortisation of acquisition-related intangible assets has increased to £4.0m (2016: £3.4m), charged primarily on the intangible assets from the Rail acquisition, which are predominantly denominated in Euros. The Group also incurred net acquisition-related expenditure of £1.7m (2016: £2.8m) during the year, £0.8m of which was in respect of the acquisition completed in the year. The acquisition-related expenditure and amortisation of acquisition-related intangible assets have been charged to the Consolidated Income Statement as specific adjusting items. Further detail is disclosed in Note 4 to the financial statements on page 130.

After the reporting date, the Group also acquired the entire issued share

capital of Control Point Corporation on 8 September 2017, for initial consideration of £5.3m (\$7.0m), rising to £7.8m (\$10.2m) subject to post-acquisition performance and retention of specific individuals. The provisional assessment of identifiable net assets acquired is £3.3m (\$4.3m), together with provisional goodwill and other acquisition-related intangible assets of £2.0m (\$2.7m). Given the proximity of the acquisition to the date of approval of the financial statements, a preliminary fair value exercise has yet to be performed. This is disclosed in Note 39 to the financial statements on page 157.

## Research and Development

The Group continues to invest in Research and Development ('R&D'), and spent £9.5m (2016: £9.4m) before government grant income of £2.4m (2016: £1.3m). This includes costs capitalised in accordance with IFRS of £3.1m (2016: £3.2m) in respect of continued development expenditure on a range of product developments around the Group and reflects our continued focus on development activity within Europe and the US. An overview of current R&D activities is presented on pages 24 and 25.

The total Research and Development Expenditure Credit ('RDEC') recognised in the current year is £6.6m (2016: £6.9m). This is comprised of an estimated RDEC credit in respect of the current year of £5.2m (2016: £5.4m), together with £1.4m arising from the routine amendment of open applications as a result of further analysis of the qualifying expenditure incurred. In the prior year, an additional non-recurring credit of £1.5m was recognised within specific adjusting items for claims made on transition to the new regime in respect of the open periods between the substantive enactment of the RDEC scheme by the UK Government and its subsequent adoption by the Group.

## Net finance costs

Finance income was £0.2m (2016: £0.3m), which is similar to the prior year, and finance costs were £2.7m (2016: £2.2m), giving net finance costs of £2.5m (2016: £1.9m). Finance costs were higher as a result of interest payments on the

Group's loan facilities drawn throughout the year, partially offset by a slightly favourable shift in respect of the interest charge on the defined benefit pension scheme.

## Taxation

The total tax charge for the year was £74m (2016: £74m), with the total effective rate of tax being 23.0% (2016: 22.4%).

Regarding the Group's deferred tax assets of £14.3m (2016: £13.0m), the Directors have considered the recoverability of the net deferred tax assets of £2.4m (2016: £3.6m) and £5.9m (2016: £4.9m) which primarily relate to the expected utilisation of historic losses in Germany and R&D tax credits in the US, respectively.

In Germany, £1.5m of the deferred tax asset relating to historic losses has been derecognised to ensure that the expected period of utilisation remains reasonable. Consistent with the prior year, a deferred tax asset has not been recognised for the current year tax losses within the consolidated tax group controlled by Ricardo GmbH, within which Ricardo Deutschland GmbH is the primary trading entity.

The Directors remain satisfied that it is probable that sufficient taxable profits will be generated in the foreseeable future, against which the recognised assets can be utilised.

## Earnings per share

Basic earnings per share decreased by 4% to 46.8p (2016: 48.6p). The Directors consider that an underlying earnings per share provides a more useful indication of underlying performance and trends over time. Underlying basic earnings per share for the year increased by 1% to 55.7p (2016: 55.2p).

Basic earnings per share, with a reconciliation to an underlying basic earnings per share, which excludes the net-of-tax impact of specific adjusting items, is disclosed in Note 10 to the financial statements on page 134.

## Dividend

The total (paid and proposed) dividend for the year has increased by 7% to 19.3p per ordinary share (2016: 18.1p) and amounts to £10.3m (2016: £9.5m). The proposed final dividend of 13.88p (2016: 13.03p)



will be paid on 17 November 2017 to shareholders who are on the register of members at the close of business on 27 October 2017, subject to approval at the Annual General Meeting on 8 November 2017.

### Capital investment

Cash expenditure on property, plant and equipment was £6.3m (2016: £8.5m) as we continue to invest in our business operations. This expenditure included new and upgraded test cell equipment and IT hardware, together with continued spend to finalise the construction of the Centenary Innovation Centre at our Shoreham Technical Centre in the UK.

During the year we commenced a process to market the test cell facilities and related equipment situated at the Group's Chicago Technical Centre for sale, as described in Note 19 to the financial statements on page 140. We continue to review the management and usage of our other test facilities outside the UK, in light of changes in the market and our desire to increase operational effectiveness.

In addition, having been approached by the landlord of leased premises at our Midlands Technical Centre, an agreement was reached to sell and lease back a property which had been built on the site, together with an extension in the term of the overall lease. The profit on disposal arising from this transaction was £0.7m, the details of which are described in Note 15 to the financial statements on page 139.

### Net debt

Closing net debt was £37.9m (2016: £34.4m). The Group had a net cash outflow of £3.5m (2016: £48.7m), after

£1.9m (2016: £45.4m) of consideration paid in respect of acquisitions net of cash acquired, and £4.4m (2016: £3.4m) of acquisition-related payments. The composition of net debt is defined in Note 34 to the financial statements on page 153.

The Group continues to focus on its management of working capital, which increased during the year primarily within our Automotive EMEA and Energy & Environment businesses. This was as a result of a number of factors, including revenue growth, an increasing mix of customers in the Middle East and Asia where payment terms have been longer, together with the phasing of revenue towards the fourth quarter as a result of a disrupted flow of orders. We also continued to invest in our major long-term assembly programme.

### Banking facilities

At the end of the financial year, the Group held total facilities of £91.1m (2016: £90.9m), which included committed facilities of £75.0m (2016: £75.0m). Of the committed facilities, a £35.0m facility is available until September 2019 and £40.0m is available until April 2020. In addition, the Group has uncommitted facilities including overdrafts of £16.1m (2016: £15.9m), which mature throughout the next financial year and are renewable annually.

Committed facilities of £59.7m (2016: £54.5m) net of direct issue costs were drawn primarily to fund acquisitions. These are denominated in Pounds Sterling and have variable rates of interest dependent upon the Group's adjusted leverage, which range from 1.6% to 2.35% above LIBOR and are repayable in the year ending 30 June 2020.

### Foreign exchange

On consolidation, income and expense items are translated at the average exchange rates for the year. The Group is exposed to movements in the Pound Sterling exchange rate, principally from work carried out with customers that transact in Euros, US Dollars and Chinese Renminbi. The average value of Pound Sterling was significantly lower against the Euro (13.1%), US Dollar (14.5%) and Chinese Renminbi (9.5%) during the year compared to the previous financial year. This was as a result of the UK referendum vote to leave the EU on 23 June 2016, which had a favourable impact on revenue during the year, but a marginal impact on profit.

Had the current year results been stated at constant exchange rates, revenue would have been £15.2m lower and reported profit before tax would have been £0.3m higher. The impact on reported profit before tax is due to the effect of foreign exchange on the amortisation of acquired intangible assets denominated in foreign currencies. Significant resulting exposures are hedged through foreign currency contracts.

### Pensions

The Group's defined benefit pension scheme operates within the UK. The accounting deficit measured in accordance with IAS 19 'Employee Benefits' was £22.2m before tax, or £18.1m after tax (2016: £21.5m and £17.5m, respectively).

The £0.7m increase in the pre-tax pension deficit was primarily due to both a reduction in the discount rate assumption to 2.6% (2016: 2.95%) and an increase in inflation to 3.2% (2016: 2.8%), offset by the use of an updated set of demographic assumptions and return on plan assets of £6.9m, together with £4.3m of cash contributions paid to the scheme during the financial year.

Ricardo remains committed to paying £4.3m each year until January 2021 to fund the pension deficit. The next triennial actuarial valuation, which will assess the level of Ricardo's future annual contributions, is currently in progress.



# Our people

Since the celebration of our centenary year drew to a close, we have been focusing on our vision for the start of Ricardo's second century. As a consultancy, services and specialist manufacturing business, our people are a key factor in that vision – those employed with us today, as well as those who will form our workforce in the future.

At Ricardo, people are respected for their contribution: integrity is demonstrated in all that we do. We provide exciting work which allows innovation and creativity to flourish and where our passion is tangible. We are conscious that the key to an engaged workforce is for everyone to understand our vision, strategy and values, together with how they can contribute to that as individuals. We continue to share

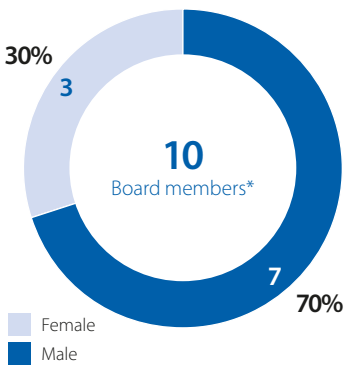
this information by using a multimedia approach with web-based channels, films, strategy brochures and face-to-face information sessions. An increased use of social media has opened new channels of communications – and not just with the younger generation. To further encourage our employees to embrace Ricardo's values and give their best possible performance for the business, various recognition awards are established around the Group.

With our growth strategy in mind, recruitment remains one of the key tasks of the human resource agenda around the globe. We continue to be viewed as an employer of choice for top-level science and engineering opportunities, together with technical and non-technical graduate and apprenticeship roles. Our

recruitment processes and employee value proposition are constantly reviewed to make sure we not only attract highly qualified engineers and scientists, but that we are also appealing to a diverse range of possible candidates.

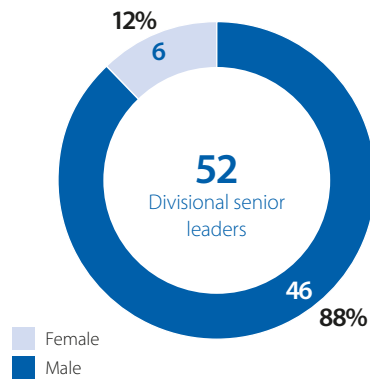
True to our vision of an increasingly diverse and inclusive culture within Ricardo, we have continued to concentrate our efforts on promoting science and engineering careers for women. This includes hiring female apprentices, graduates and professionals, and reviewing our internal promotion processes to exclude any implicit gender bias. With a broader sense of social responsibility, we have also established a mentoring programme for female undergraduates and are in our second year of sponsoring a prize for the 'most

## Board members

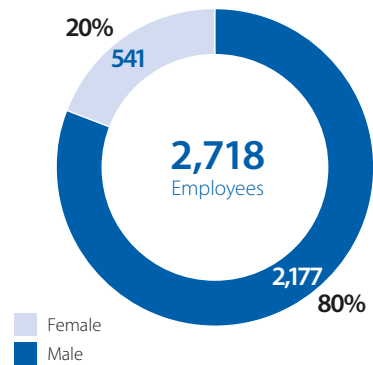


\* Includes Company Secretary

## Senior leadership



## All employees



### Our people Angela Johnson

Head of Knowledge & Technology Strategy  
Ricardo Strategic Consulting



*As part of the Strategic Consulting Division, the Ricardo Knowledge & Technology Strategy teams provide business intelligence and consulting services to a global client base.*

*Ricardo Knowledge supports over 40 clients in expanding their expertise through provision of technical support and insight via subscription services and training. Through services such as scenario planning and technology roadmapping, Technology Strategy helps clients plan for the future.*

*As head of the two teams it is my role to understand our customers' needs, identify opportunities to provide new added-value services and ensure we continue to deliver customer excellence in all that we do.*



**Celebrating the successful delivery of the 10,000<sup>th</sup> engine designed and developed in partnership with McLaren, manufactured at Ricardo's purpose-built performance engine factory**

improved female undergraduate', which has been extremely well received. The prize was awarded to a student from Cambridge University for the second time.

Going forward, we will continue on the path we have successfully started out on; concentrating on focusing our employer branding to be more appealing to women, a modified on-boarding process for female technical staff including a mentoring programme and inclusion training for managers.

We remain committed to the promotion of the Science, Technology, Engineering and Mathematics ('STEM') agenda in schools, in order to nurture our future engineering resources. We have also established a programme in the UK that engages our own engineering graduates in these activities, allowing them to take on social responsibility, grow their interpersonal skills and share their enthusiasm at the same time. Similar

activities are being undertaken in other international locations.

In the UK, commitment to apprentice development continues to be strong, with most apprentices achieving further qualification. Our apprentice programme now encompasses a broader range of functions across our business, including human resources and finance, in addition to traditional engineering apprenticeships. The Apprenticeship Levy, introduced by the UK Government with effect from April 2017, has given the apprenticeship discussion a new push, introducing new funding possibilities for degree apprenticeships.

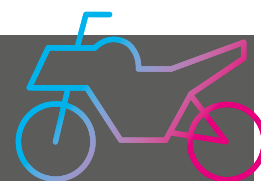
Once hired, we make sure our new employees have the best possible on-boarding experience, with a globally standardised induction programme that includes a 'buddy scheme', structured induction plans, interactive online material and training, as well as a survey

at the end of the on-boarding period to ensure continuous improvement. From the beginning, we encourage our employees to actively engage in their own career development by stretching their wings and seeking opportunities to broaden their experiences and deepen their knowledge. In addition to any formal training, this might be through taking part in one of our various internal strategic- or improvement-oriented projects, working on a customer project at a different technical centre or on-site at a client organisation, or by going on an international assignment.

There will be significant and interesting changes in people, technology and society in the future – and with Ricardo's shared vision of contributing to safety and sustainability in mobility and energy generation while protecting scarce resources, our people will have a chance to positively contribute to them all.



**Our people**  
**Dipak Mistry**  
Head of Urban Mobility  
Ricardo Motorcycle



*Ricardo Motorcycle has grown through recent strategic acquisitions to become one of the world's foremost independent design and engineering partners to the motorcycle and scooter industry. Most importantly, these acquisitions position Ricardo to leverage the know-how of developing small intelligent vehicles to provide future personalised urban transport solutions.*

*As Head of Urban Mobility I am responsible for the delivery of a major global vehicle programme for a key European urban mobility client with manufacturing facilities in China, and identifying strategic growth areas to address the future challenges of urbanisation.* ”



# Corporate responsibility and sustainability

## Why it matters to Ricardo

Ricardo has a proactive and engaged approach to corporate responsibility and sustainability. The environment is a key driver for our strategy and is seen in many of our activities, where *Delivering Excellence Through Innovation & Technology* provides the central focus for all of our teams. This is embedded in what we do and the solutions we deliver:

- Developing new combustion systems and engineering solutions to meet the next steps in vehicle emissions regulations;
- Improving vehicle fuel economy and energy efficiency through engine developments, lightweight vehicle structures and transmissions, hybrid vehicle systems and electrification, renewable energy and rail operating efficiency;
- Helping governments and cities address climate change, emissions, air quality, energy and waste challenges;
- Providing policy and technical advice across the public and private sector to improve the environmental, social and economic performance of the transport sector;
- Improving rail safety through the provision of safety audit services, innovative safety products (see pages 60 to 63) and the activities of Ricardo Certification, providing third party independent oversight on new railways, rolling stock and safety-critical technologies; and

- Proving chemical emergency response advice to emergency services and industry through the National Chemical Emergency Centre.

We rely on innovation, talent, skills and customer care from our employees, in whom we invest and develop for the benefit of all our stakeholders. Our values and policies are designed to ensure that we and our suppliers operate ethically, honestly and meet human rights obligations.

Ricardo's employees are engaged as active members of the communities where most of our larger sites operate, with a strong focus on working to promote Science, Technology, Engineering and Maths ('STEM') subjects in schools and colleges as this links directly to the next generation of engineers and scientists who will be the core of our future value chain.

As a responsible employer, we seek to protect and care for our employees by providing a safe and healthy work environment and by minimising the environmental impact of our operations.

## The environment – a strategic driver in action

The environment is at the heart of what we do and is embedded in our strategy, shown on page 11:

- Transport & Security work is driven by the worldwide trends in climate change, emissions and fuel consumption legislation;

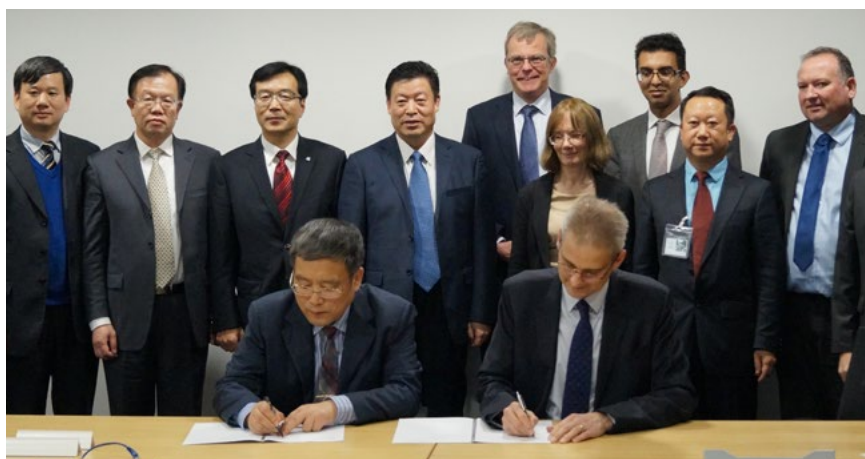


- Energy work is similarly driven by the need to provide more sustainable and efficient solutions in the areas of power generation and renewable and clean energy; and
- Scarce Resources & Waste teams provide solutions to improve air quality, reduce environmental risk and improve efficiency in the use of resources and waste management.

We support all of these areas with research and development activities to enhance our capabilities. This is described on pages 24 and 25.

## Environmental thought leadership

As an organisation, Ricardo Energy & Environment is renowned for providing strategic consultancy on a wide range of technical environmental issues. As a result, we regularly provide key thought leadership through a number of different routes. These include attending and co-chairing the technical working



Ricardo Energy & Environment and China International Engineering Consulting Corporation signing a memorandum of understanding to create greater access to global environmental, energy, water and sustainability services throughout China





Ricardo is currently piloting remote sensing measurements around the UK. Our vehicle emissions database currently holds 50,000 real-world driving emission measurements from road vehicles and we anticipate that this number will exceed 100,000 by the end of 2017

group meetings of a broad range of international bodies and directly advising major donor organisations and country governments, through to speaking at events, running webinars and providing practical information on our website. The subject matter includes:

- Policy development for international governments;
- Guidance and advice on environmental issues and legislation for national and multi-national companies, such as the EU's Non-Financial Reporting directive or global transportation of dangerous goods regulations; and
- Developing practical toolkits and guides for international development organisations.

This support is aimed at directly helping governments and organisations to reduce their environmental impact and stem the effects of climate change: the aim is to position Ricardo as a 'go-to expert' in the relevant markets.

Since the 2015 Paris Agreement, Ricardo has been delivering thought leadership to help countries understand a best-practice methodology for implementing the agreement's commitments. The series of online and live events have been attended by over 1,500 government officials and key stakeholders within international donors and development partners. Ricardo's climate change experts, in conjunction with the Climate & Development Knowledge Network ('CDKN') have developed a reference manual *Planning for NDC implementation: a quick-start guide* that has been used by governments around the world to support the implementation of their climate change commitments.

In addition, Ricardo has developed and delivered thought leadership to the aviation, marine and heavy manufacturing industries, providing guidance on the development of sustainable business growth and regulatory compliance.

## Environmental benefits

Ricardo delivers many positive environmental outcomes which are the result of the work we undertake in the Technical Consulting businesses. This can be categorised as:

- Ricardo-funded and client-funded engineering projects where technology is developed to provide low-emissions and high-efficiency technologies for incorporation into products in all parts of the world;
- Lower carbon use from the results of engineering projects which lead to more efficient consumer products manufactured by our clients;
- Environmental consulting work which is largely undertaken by Ricardo Energy & Environment; and
- Operating efficiency work for rail operators and rolling stock manufacturers undertaken by Ricardo Rail.

These products and services will have an impact on the future levels of emissions, waste, energy usage, water consumption and noise across the sectors we serve. The cumulative benefits of projects we complete each year saves many multiples of our operational carbon footprint over the life of the products we engineer.

The very nature of Ricardo Energy & Environment's consultancy work provides a further significant environmental benefit: we work with businesses, governments and international organisations to help find solutions to some of the most pressing environmental challenges. We have a comprehensive environmental consulting capability which provides:

- Excellence in thought leadership around economic, societal and environmental interactions;
- Extensive understanding of the climate change, resource scarcity and sustainability agendas;
- Deep understanding of policy drivers, providing insight and project delivery for business and industry; and
- Economic modelling and data management to identify and realise value for business and industry.

### Operational environmental impact and greenhouse gas emissions

Ricardo is committed to keeping the environmental impact of the Group's facilities and activities to a minimum as well as ensuring that our services have positive impacts on society. The Board's commitment is embodied in our environmental policy. It is available through our intranet and to the public via the website [www.ricardo.com](http://www.ricardo.com). The drivers for the policy are:

- Delivering services that enable strategic improvements for our clients and the end users of their products and services;
- The need for continuous improvement; and
- The desire to be responsible members of the local communities in which Ricardo operates.

The impact of our operations, particularly testing and manufacturing, are the largest contributors to our operational carbon

footprint and greenhouse gas ('GHG') emissions. Our testing for customer and research programmes primarily uses fuels and electrical energy in addition to heating some of our buildings.

Our manufacturing energy use is predominantly power for machine tools and assembly facilities and gas used in our heat treatment plant. Our Scope 2 use is all electricity. We do not currently measure our Scope 3 emissions.

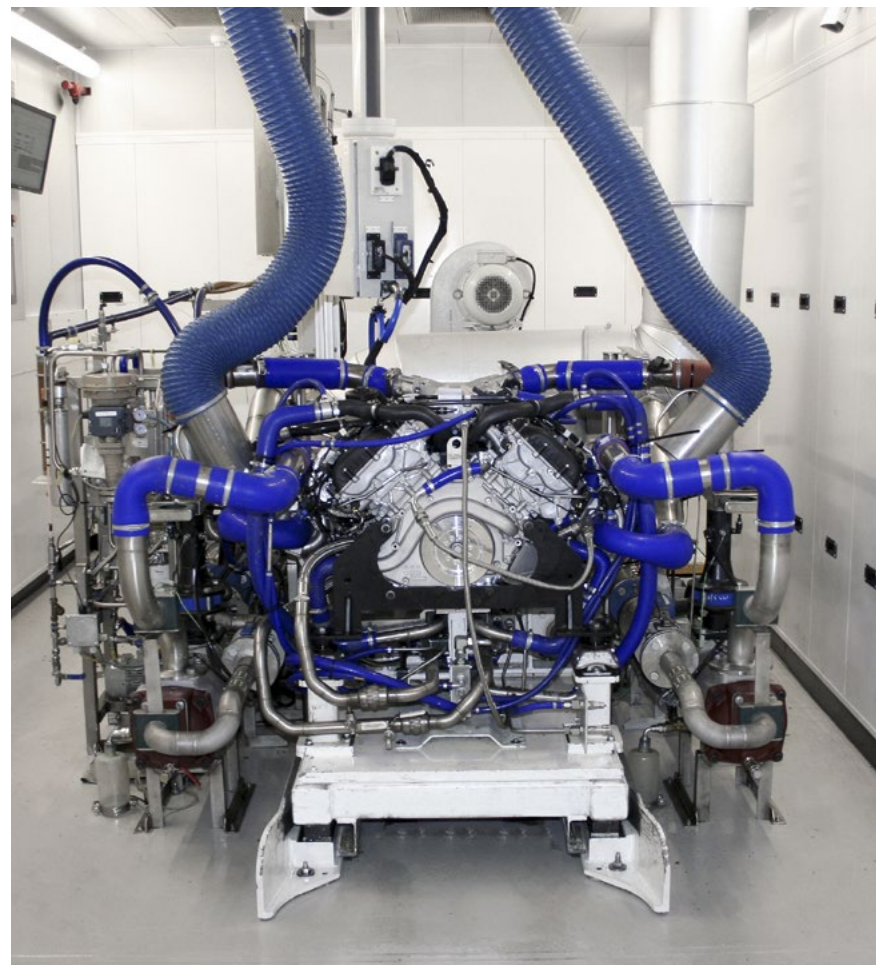
We comply with the Companies Act 2006 (Strategic and Directors' Report) Regulations 2013 on GHG Emissions and have stated our comparative history in our Strategic Performance on page 15. As this requires us to include fuels used in engine and vehicle testing, variability in results year-on-year can be expected due to the varied mix in types of test and engine size.

Projects to reduce energy consumption and manage waste responsibly are actively encouraged and have become more important

as unit fuel costs increase and waste streams have become more significant as the manufacturing activities of our Performance Products business have grown.

We focus our operational carbon footprint improvements on underlying energy efficiency prior to use of fuels for testing. We continue to use tonnes of carbon dioxide equivalent ('tCO<sub>2</sub>e') per employee as an intensity measure.

This year we also calculated our market-based Scope 2 emissions in the UK, as well as our location-based emissions, which have been reported on page 35 using government and International Energy Agency ('IEA') factors in accordance with the GHG protocol's Scope 2 guidance. Our UK operations are our biggest consumer of electricity, and the supply we procure includes some coal and natural gas but over 50% is from renewable or zero emissions sources. This means that, when using the market-based approach, our Scope



Our new end of line engine test cell which has a zero carbon equivalent fire suppression system





Ricardo supporting customers with water quality analysis

tCO<sub>2</sub>e '000 per employee

tCO <sub>2</sub> e '000	2017	2016	2015
Scope 1	<b>8.1</b>	11.4	8.2
Scope 2	<b>10.2</b>	10.9	10.4
Total	<b>18.3</b>	22.3	18.6
tCO <sub>2</sub> e per employee	<b>6.7</b>	8.4	8.8

In deciding if an emission is within Scope 1, we apply the operational control test.

2 emissions are reduced by around 45%. Even though this is the case we still strive to continually reduce our underlying consumption.

Other environmental impacts include waste streams, which are monitored to identify potential improvement opportunities and to ensure legislative compliance. Higher-risk areas of the facilities, such as fuel storage and distribution systems, have containment and inspection regimes which meet local legislative requirements.

Many of Ricardo's clients require certification to the environmental management system standard ISO 14001 for their key suppliers. We are accredited

to this standard in the majority of our locations. The application of the policy is defined by appropriate processes and procedures as part of the quality system in each division. Many of these are closely linked to both quality and health and safety procedures.

The suite of certifications and the supporting internal and external audit programmes are used to check policy effectiveness, share best practice, identify improvement opportunities and ensure compliance. Staff training in health and safety and environmental matters is a priority and is reviewed annually as part of normal appraisal processes.

**Governance – corporate responsibility**

The Board reviews the key elements of corporate responsibility on an annual basis. To underline the importance of integrity in all relationships between employees and stakeholders, we have ethics, fraud prevention and whistleblowing policies which are communicated to all employees. A summary of these is communicated externally through our Code of Conduct, which includes the policy elements to meet our human rights obligations.

Under our ethics policy we do not permit bribery, anti-competitive or corrupt business practices in any dealings. Under our fraud prevention policy, we do not allow intentional acts by one or more individuals within the business to use deception or theft to gain unjust or illegal advantage. Under our whistleblowing policy we provide a procedure for any employee to raise any malpractice concerns in an appropriate manner, with protection to the whistleblower. Ethics and whistleblowing is reviewed annually by the Audit Committee.



Ricardo Shanghai employees participate in a dragon boat racing team building event held in May 2017



### Modern slavery

We implemented the requirements of the Modern Slavery Act 2015 and have published an updated statement for this financial year on our website. The subject is reviewed annually by the Audit Committee.

### Human rights

The Group firmly believes in the principles behind the Universal Declaration of Human Rights. We support this by having a strong commitment to compliance with laws and regulations where we operate, and by expecting the same from our suppliers. We articulate this via our Values and Code of Conduct, the relevant policy elements of which are:

- Being honest, ethical and above reproach with each other and with our stakeholders in all our business dealings;
- Treating all others as we would like to be treated ourselves;
- We will not engage in activity that can be considered as trafficking in persons, including the use of forced labour or procurement of immoral services for the performance of contracts;
- There should be no discrimination against, or harassment of, any employee or job applicant either directly or indirectly;
- We encourage all our employees to take an active role against all forms of discrimination and harassment; and
- Ricardo will only employ or use staff who are appropriately vetted and have



the proven right to work in the country of employment for the type of work being undertaken.

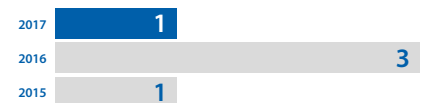
The Group's position on human rights is supported through a number of ethics and employment policies which are designed to ensure we conduct business in a legal and ethical manner at all times.

### Health and safety

Ricardo is committed to compliance with local health and safety legislation, to a safe working environment and to a very low level of reportable accidents. We support training in health and safety awareness, impending changes in relevant legislation and other specialist health and safety subjects. Health and safety activities are verified by regular internal audits and inspections

### Health and safety

Reportable accidents



Based on current RIDDOR definitions

and certification to OHSAS 18001 in our technical centres in the US, UK, Netherlands, Germany and Czech Republic.

Ricardo Energy & Environment has a Gold Award from the Royal Society for the Prevention of Accidents ('RoSPA') – a demonstration of our commitment to good governance and to being an employer of choice. Our health and safety policy is available through our intranet and to the public via the website.

We recognise the level of reportable



'I.Mech.E. Robot Challenge 2017' event organised by STEM Sussex at the Ricardo Centenary Innovation Centre in the UK

accidents as a primary performance indicator. The number of reportable accidents reduced in 2017: the overall level is still low and shows the success of our health and safety policies. We continue to focus on reducing accidents and near-misses as part of our commitment to continuous improvement and loss prevention.

## Suppliers

Relations with our suppliers are essential in achieving client and shareholder satisfaction. Our policy is that key suppliers should be certified to ISO 9001 and ISO 14001 standards, and all suppliers are encouraged to obtain these certifications. Local suppliers are used where commercially practical. There are no significant supply contracts which are essential to the business of the whole Group, and we are not reliant upon any suppliers that would jeopardise the independence of the business.

Initiatives are managed by our Head of Global Procurement and deliver savings by consolidating the supply base and reducing the total cost of doing business.

We strongly encourage our suppliers to comply with our Code of Conduct or their own equivalent policies.

## Local communities

It is our policy and objective to make a positive contribution to all countries and communities in which we operate, particularly in education in areas local to our main sites. Most of the larger Ricardo offices support local community activity and give charitable donations, particularly where employees participate in community or charitable fund-raising activities. The focus is on creating sustainable links and on improving the image and understanding of the business and the engineering profession in the community.

Community engagement promoting STEM subjects and diversity has been a key part of our employee involvement. A wide range of activities have been undertaken:

- Close partnerships with secondary schools close to our larger UK sites supporting curriculum delivery and teacher engagement in STEM;

- Most of our UK graduates are automatically enrolled as STEM ambassadors when they join the business;
- Sponsorship of regional 'Big Bang' STEM events where over 11,000 students attended to experience opportunities from many employers; and
- Ricardo Software supports university teaching with its products in 200 locations across 38 countries.

We also work with our local communities to provide business input on economic regeneration, and we actively engage in local partnerships, particularly in the area where our Shoreham Technical Centre is located, where we are the largest private sector employer.

We often match staff donations to charitable activities, particularly where there is active staff participation in events. Financial contributions to charities in the year to 30 June 2017 were £35,652 (2016: £26,226). The effectiveness of these policies is informally measured by community feedback.

# Risk management and internal control

The Board has overall accountability for ensuring that risk is effectively managed across the Group. We consider that effective risk management is critical to the achievement of Ricardo's strategic objectives and the long-term sustainable growth of our business. That said, such systems are designed to manage rather than eliminate the risk of failure to achieve Ricardo's objectives and can only provide reasonable assurance against material misstatement or loss.

Risks are reviewed by all business areas on a half-yearly basis and measured against a defined set of likelihood and impact criteria. Risks are measured before mitigation and with the effect of compensating controls being applied. This is captured in consistent reporting formats, enabling the Group Risk Manager to consolidate and rank the risk information and summarise the key risks in the form of the Group risk profile ahead of it being submitted to the Board for final approval.

As part of the risk management process, Directors and Senior Managers are required to certify on a bi-annual basis that they have established effective controls to manage risk and to comply with legislation and Group procedures and disseminated Group policies.

Ricardo's internal control and monitoring procedures include:

- Clear and understood responsibility by both line and financial management for the maintenance of good financial controls and the production of accurate and timely management information;
- Divisional finance leads are required to confirm that appropriate controls are in place and identify any exceptions on a monthly basis, with the outcome being reviewed by the Group Financial Controller and Head of Internal Audit;
- Divisional finance leads have line management responsibility to their divisional Managing Directors, but also have an independent reporting line to the Chief Financial Officer;
- Control of key financial risks through clearly set authorisation levels and appropriate segregation of accounting duties, the control of key project risks through project delivery and review

systems, and the control of other key business risks through a number of processes and activities recorded in the Group risk register;

- Detailed monthly forecasting and reporting of trading results, financial position and cash flow, with regular review by management of variances from budget;
- Reporting on compliance with internal financial controls and procedures by Internal Audit; and
- Review of reports by external auditors.

To ensure our risk process drives continuous improvement across the business, we monitor the ongoing status and progress of key action plans against each risk on a half-yearly basis. Risk is a key consideration in all strategic decision-making at Board level. In the June 2017 risk review cycle, risks associated with our customers, our employees and our finances included consideration of the potential impact as a result of the referendum vote for the UK to leave the EU and the subsequent triggering of 'Article 50'.

The Group has risk management processes in place for projects and other business risks. Contract risks are managed through a project management process which is closely linked to measurement of financial performance. The majority of active Technical Consulting projects are reviewed on a monthly basis. The highest risk category projects are either independently reviewed on a quarterly basis or once significant milestones are deemed to have been achieved. Non-contract risks are owned by the leaders of global product groups, Group functions and divisional Managing Directors. These non-contract risks are analysed and reviewed regularly and are recorded in the Group's risk register in liaison with the Group Risk Manager, who has an independent reporting line to the Chairman of the Audit Committee. The Group's approach to risk management is to identify key risks early and to remove, control or minimise the impact of them before they occur.

Risk transfer, via insurances, is managed by the Group Risk Manager under the direction of the Chief Financial Officer.

The insurance programme is reviewed annually by the Board to ensure that it meets the business needs as the risk profile changes.

Risk appetite is managed by a number of internal controls via authority limits as well as setting excesses on insurances. Risk appetite was reviewed during the year as part of the Board's review of risks and stated as an internal policy document.

The Group's internal audit function provides assurance regarding the systems of internal control and risk management and compliance with applicable legislation and regulations. This is complemented by the internal audits required as part of maintaining certifications to international standards for management systems. These risk management and internal audit processes and their effectiveness are reviewed annually by the Audit Committee.

Financial risks faced by the Group comprise capital risk, liquidity risk, credit risk and market risk (comprising interest rate risk and foreign exchange risk) and the Group's objectives, policies and strategies in respect of these risks are set out in Note 24 to the financial statements on pages 143 to 145.

We comply with the Code by ensuring that:

- We are classifying risks as either strategic or operational and as either internally or externally driven;
- The risks are evaluated on a gross and net risk basis; and
- The Chief Executive Officer reviews the higher-rated risks on the register with the Audit Committee twice each year, with the Executive Directors and Chairman present.



# Principal risks and uncertainties

In common with all businesses, we face risk and uncertainties on a daily basis. It is the effective management of these that places us in a better position to be able to achieve our strategic objectives and to embrace opportunities as they arise.

We set out below, and on the following page, details of our principal risks, the mitigating activities in place to address them, and additional actions implemented to further reduce net risk to the Group. It is recognised that the Group is exposed to a number of risks, wider than those listed. Additional risks and

uncertainties not presently known to management, or currently deemed to be less material, may also have an adverse effect on the business. The mitigation of all the principal risks is within the Group's risk appetite, which is reviewed annually by the Audit Committee.

## Movement in risk

↓ Reduced risk     
 → No change     
 ↑ Increased risk

## Customers and markets

The Group is largely dependent on a dynamic, increasingly diverse and politically volatile marketplace which is exposed to many external political and economic pressures, such as the referendum vote for the UK to leave the EU, as well as competition and structural change caused by global economic, cost base, environmental, technological, climate change and capacity concerns.

### Impact

This could cause changes or uncertainty in client product plans or government policy, leading to delays in the placement of orders, the redirection, delay or curtailment of contracts, slippage in payments or variations in demand for resources, and availability of R&D funding sources. The precise timing of order receipt and rate of ramp-up of project workload delivering the subsequent revenue, profit and cash streams may give some volatility in our ability to forecast future performance.

### Mitigation

These risks are mitigated by the strategy of broadening the base of the business to reduce exposure to any one specific client, territory or market sector, and the success of this strategy is measured by the key performance indicators for client dependency and sector diversity shown on page 14 and by the geographic spread of revenue, as disclosed in Note 3(b) to the financial statements. In the event of a sudden downturn, contingency plans are quickly deployed to minimise the short-term performance effects and preserve cash whilst protecting the long-term needs of the stakeholders. The impact of insolvency risk is mitigated by robust working capital management and the use of credit insurance where this is economically available.

## Contracts

The majority of the Group's revenue arises from fixed-price contracts for engineering and environmental consulting, and certification services, with an increasingly broad range of projects, customers and geographies. The costs and liabilities to complete these contracts may be different from initial estimates, thus reducing or increasing margins and project timescales. In product supply contracts, there is a risk of dependency on specialist suppliers; additional risks include product liability, recall or warranty claims. Contracts denominated in foreign currencies can be subject to exchange rate risk.

Failure to perform on contracts, the infringement of the rights of others, or a faulty product could potentially subject the business to a claim from a customer and loss of reputation or reduced opportunity for repeat business or increased costs. On contracts where we exceed planned performance, additional profit may be generated. Failure of production processes or product validation could lead to warranty or recall claims. Failure or poor performance of a supplier could disrupt delivery to clients and increase operating costs. Adverse foreign exchange rate movements could affect profitability.

These risks are proactively managed by clearly defined lead qualification, bidding, contracting and project management processes, whereby projects are categorised according to their risk level, which in turn dictates the level of approval or review required. Internal procedures are in place to ensure that the technical content of our output is of high quality and meets client requirements without infringing the rights of others, within time and cost targets. We are increasing our focus on project leadership competencies. These processes are subject to continued improvement focus with the central leadership of the Chief Operating Officer and are core to our strategy. Procurement processes are in place to assess critical suppliers and selections are often made with the involvement of the client. In product supply contracts, there are rigorous quality assurance processes in place to reduce the risk of product liability, warranty and recall claims. Significant contracts in foreign currencies are hedged to protect against volatility.

## People

Ricardo is a business that is knowledge-driven and people-led, with a focus on attracting and retaining the best talent. Recruiting, developing and retaining knowledge and talent in the right locations is essential.

The failure to recruit, develop or retain the very best talent would restrict growth and the execution of the strategy and have an impact on delivery and client relationships.

We are focusing on a model of 'bringing in and bringing on' the best talent. We aim to ensure that we actively develop and manage staff to encourage their optimum contribution, encourage mobility and professional development, and provide appropriate remuneration and working conditions. As our business grows further internationally, we will be able to increase the range of services we deliver from more locations by focusing on mobility. Our people as stakeholders are reviewed further on pages 30 and 31.

	Impact	Mitigation
<p><b>Technology</b></p> <p>The business is driven by changes in technology to meet the needs of markets, sectors and regulators on varying time scales.</p>	<p>If the Group invests in the wrong technologies, it could lose marketplace advantage and business levels could reduce. If there are movements in the implementation of new regulations, which in turn accelerate or delay client programmes dependent on new technology, the time taken to deliver returns from our R&amp;D programmes may also increase.</p>	<p>Our R&amp;D programmes are developed through a mixture of client consultation, long-range forecasting, thought leadership and deep technology roadmap development. Many of our programmes are collaboratively developed and delivered with governments, clients, partners and suppliers, which creates strong links to the market and ensures the output is relevant and credible. The programmes are approved and delivered by the Ricardo Innovations Division, which operates within Ricardo as a global R&amp;D organisation singularly focused on delivery and exploitation of approved programmes. This enables staff and facilities to be dedicated onto relevant programmes regardless of geography, which will accelerate delivery of innovation to market and promote the exploitation of developed intellectual property and know-how. Further details of our R&amp;D programmes are given on pages 24 and 25.</p>
<p><b>Compliance with laws and regulations</b></p> <p>The Group's operations are subject to an increasingly wide range of domestic and international laws, regulations, restrictions and standards.</p>	<p>Non-compliance with these laws, regulations, restrictions and standards could expose the Group to fines, penalties or loss of reputation, or result in trading restrictions which could have a material adverse effect on the business.</p>	<p>To mitigate these risks, the Group has a number of defined policies and operating procedures, and takes professional advice, where considered necessary, to ensure that employees and others act with the highest ethical standards and within local legal and regulatory requirements. Our Code of Conduct is published on <a href="http://www.ricardo.com">www.ricardo.com</a> to increase awareness and provide availability to external stakeholders. Also, the Group's internal audit programme includes within its remit the review of compliance with applicable legislation and regulations, and awareness of key policies. Policies are updated as regulations change and as our knowledge of best practice increases. We aim to anticipate the effects of working in new countries and new sectors, particularly within our Rail business where the range of regulations, standards and laws with which we need to comply and the list of new territories where laws, regulations and cultures are addressed.</p>
<p><b>Defined benefit pension scheme</b></p> <p>The Group has a UK defined benefit pension scheme which currently has a funding deficit. The result of the referendum vote for the UK to leave the EU has the potential for increasing volatility.</p>	<p>Any decline in the value of the pension fund assets, improvement in the life expectancy, long periods of high inflation or future decreases in interest rates could increase the funding deficit and require additional funding contributions in excess of those currently expected.</p>	<p>The current UK funding plan was agreed on the basis of a valuation undertaken at 5 April 2014 and anticipates deficit recovery contributions being made until January 2021. The next triennial actuarial valuation, which will assess the level of Ricardo's future annual contributions, is currently in progress. The Group also closed the pension fund to future accrual on 28 February 2010. In addition, the Group regularly monitors the performance of the pension fund.</p>
<p><b>Financing</b></p> <p>The Group is in a net debt position, having drawn on available facilities primarily to fund acquisitions.</p>	<p>There is a risk of the Group being unable to secure sufficient funds or the cost of funds and facilities being high.</p>	<p>This risk is managed by robust cash management, regular improvement initiatives, monitoring forecast and actual cash flows, maintaining good relationships with the Group's bankers and ensuring sufficient borrowing facilities are in place at all times to support the Group's requirements, with additional headroom available to meet possible downside scenarios. The Group has ample facility and covenant headroom. Further details of the Group's borrowing facilities and other financial risks can be found in Note 24 to the financial statements.</p>
<p><b>Cyber risk</b></p> <p>Ricardo has valuable intellectual assets comprised of propriety, customer, and supplier data.</p>	<p>The theft or loss of intellectual assets could result in reputational damage, loss of competitive advantage, business disruption and financial penalties.</p>	<p>Ricardo has adopted an information governance framework based on the ISO 27001 Information Security standards. Dedicated Information Security resources monitor and manage our threat profile. IT risks are discussed monthly and are formally reviewed each quarter; external penetration tests are conducted to augment our control regime. The outputs from the IT Risk Register are integrated with Ricardo's Enterprise Risk Management process. The Group IT Director is accountable for managing cyber resilience; biannual briefings are made to the Audit Committee.</p>



# Viability statement

The Directors have assessed the prospects of the Group in accordance with provision C.2.2 of the 2016 UK Corporate Governance Code for this year ended 30 June 2017.

## The context supporting the assessment

The Group's prospects are underpinned by its business model and strategy, which can be found on pages 8 to 23. The Group continues to follow a balanced approach to its strategy, which is subject to ongoing monitoring and development as described below. The underlying operating profit of the Group has grown on average by 11% over the last five years and the Group has a closing year-end order book of £248m, of which 38% is expected to be workable beyond 12 months from the year-end. The order book comprises the value of all unworked purchase orders received.

The Group continues to be focused on global engineering and environmental consulting together with the development of longer-term, multi-year contracts and relationships, underpinned by global macro trends. The Board has considered the risk appetite and profile of the Group in this context, and has determined that this remains appropriate for the Group as a whole.

## Assessing the prospects of the Group

The Group's prospects are assessed primarily through its annual strategy review and business planning processes, which cover a five-year period and a three-year period, respectively, and are both led by the Chief Executive Officer.

The strategy review is a forward-looking process and is undertaken by the divisions, with full participation by members of the Board, which results in a five-year strategic plan. Part of the Board's role is to review the performance

of the Group in the last financial year and to consider whether the strategic plan remains appropriate. This includes an assessment of changes in the market and competitive environment, together with macroeconomic, political, social and technological changes. Actions are implemented as necessary to continue to support the strategic plan.

Detailed business plans are also prepared during the last quarter of each financial year by all divisions and relevant functions are involved, including Finance and Treasury, which are then reviewed and approved by the Board. The first year of the business plan forms the Group's annual operating budget. This is subject to a re-forecast on a monthly basis. The second and third years are based on the overall content of the year one business plan together with the strategic plan, having been flexed for known or anticipated events.

## Assessment of viability

The three-year business plan reflects the best estimate of the future prospects of the Group and has been stress tested for certain scenarios. The impact on the Group's detailed financial plan has been quantified and presented to the Board as part of the approval process. These scenarios, which are based on aspects of the principal risks including customers and markets, contracts and financing as set out on pages 39 and 40, represent severe but plausible circumstances that the Group could experience.

The results of the stress testing showed that the Group would be able to withstand the impact of these scenarios occurring over the period of the plan by making adjustments to its operating activities within the normal course of business.

The Group also considered a number of scenarios that would represent serious threats to its liquidity, including reverse

stress testing. None of these scenarios were considered to be plausible.

## Statement

The Directors have assessed the prospects of the Group over the three-year period to 30 June 2020 and confirm that their assessment of the principal risks facing the Group was robust. A three-year period was selected for the following reasons:

- This period reflects the detailed business planning cycle;
- Customer lead times and typical engineering programmes are no longer than three years; and
- Although the strategic plan covers a five-year period, the Group's order book and pipeline of opportunities does not extend significantly beyond three years.

Whilst the Directors have no reason to believe the Group will not be viable over a longer period, given the inherent uncertainty involved, the stress testing scenarios considered as part of the three-year business plan, together with the reasons outlined above, a three-year period is deemed most appropriate.

Based on their assessment of prospects and viability, the Directors confirm that they have a reasonable expectation that the Group will be able to continue in operation and meet its liabilities as they fall due over the three-year period ending 30 June 2020.

## Going concern

Given the viability statement above, the Directors therefore considered it appropriate to prepare the financial statements on a going concern basis, as explained in Note 1(a) to the financial statements on page 122.

Our 2017 Strategic Report, from page 4 to page 41, has been reviewed and approved by the Board of Directors on 13 September 2017

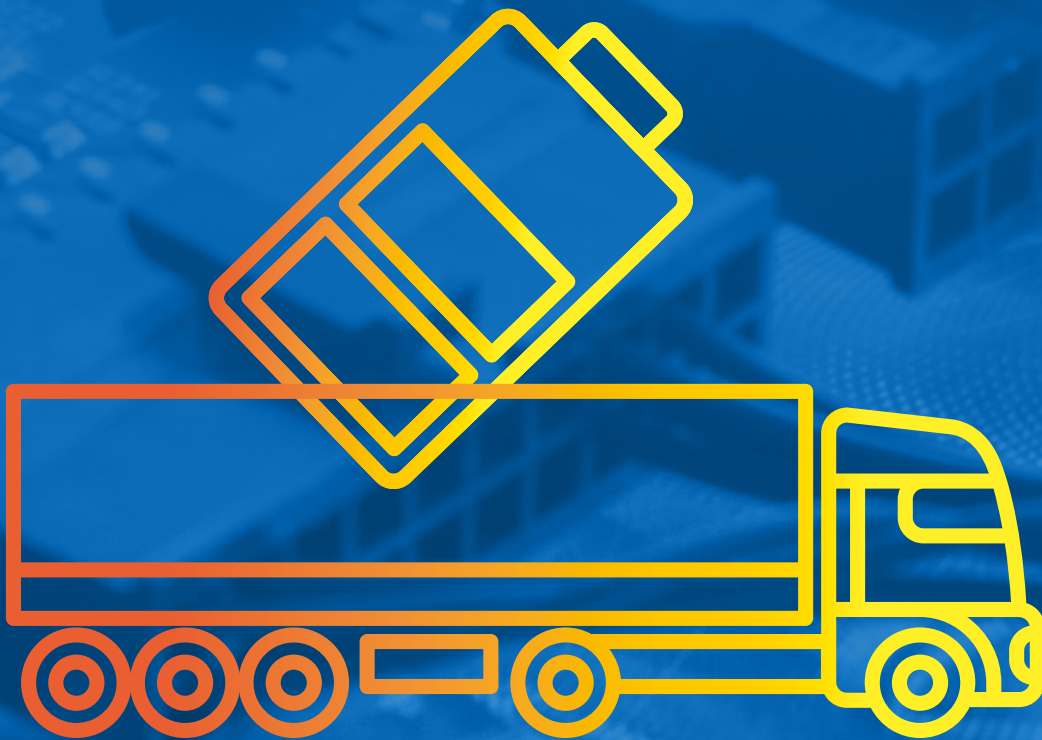


**Dave Shemmans**, Chief Executive Officer  
13 September 2017

# Case studies



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# TACKLING



NANOPARTICLE

# EMISSIONS

*The emission of vehicle exhaust particles as small as just ten nanometres – one hundred thousandth of a millimetre, and significantly below the threshold of current regulations – is an increasing concern around the world in terms of air quality and risk to public health. Ricardo is spearheading research into the measurement and control technologies that will enable future regulation to address this emerging pollutant of concern*





*Tackling nanoparticle emissions*

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The control of particulate emissions in vehicle exhausts has been something of a success story for the automotive industry in recent years. In a ground-breaking initiative by Ricardo and its partners on the Particle Measurement Programme ('PMP') in the early 2000s, the technology and standards frameworks for the measurement of particle *number* ('PN') were developed, in contrast to the conventional measurement of aggregate particulate *mass*.

Now this work is being taken forward once more, and Ricardo and its research partners are pushing even further with the aim of measuring particles of a size range only marginally greater than the molecular level.

The original work of the PMP was crucial in moving the science of particle emission regulation to a stage where tangible improvements would effectively show through in every new vehicle sold. In particular, Diesel Particulate Filters ('DPFs') became a standard fitment which, if maintained correctly, effectively eliminate the problem of particle emissions from diesel engines. The regulations enabled by the original work of the PMP now prescribe that, in addition to meeting the previous mass-based requirement, new vehicles may not emit more than  $6 \times 10^{11}$  particles per kilometre over the standard homologation drive cycle.

This particle number limit is based on (non-volatile) PN measurement above a size threshold of approximately 23 nanometres ('nm'). This limit was established both in terms of what was practical to achieve accurately and in a repeatable manner at the time, as well as representing the approximate primary particle size of soot or black carbon emitted as a result of incomplete combustion.

### Size matters

The need to improve urban air quality is the major impetus for ongoing research by Ricardo

and its partners on the PMP. This work is aimed at monitoring and regulating particle emissions down to sizes in the region of just 10 nm. There is a growing body of settled scientific opinion that the negative health effects associated with particulate emissions are more closely correlated with either the *number* of particles or the total surface *area* of those particles, rather than with the overall *mass* emitted.

There are in effect two reasons for this. Firstly, for a given mass of particulate emission, a much larger surface area will be available if there are a greater number of smaller particles rather than fewer larger ones. The particle surface is effectively the transport medium for other compounds generated by combustion or surviving it, meaning that it is not just the particle that can be ingested into people's lungs, but what it carries too. A larger surface area – albeit spread over a greater number of smaller particles – therefore means an increased likelihood of these compounds being ingested.

Secondly, while the human respiratory system has evolved to deal with larger particles such as dust or pollens, it is not so well equipped to deal with much smaller ultra-fine and nanoparticles. Nanoparticles can enter the bloodstream directly during respiration through a process of translocation and can collect in vital organs such as the brain or liver, with consequent negative health effects.

### Gasoline is the future focus for nanoparticles

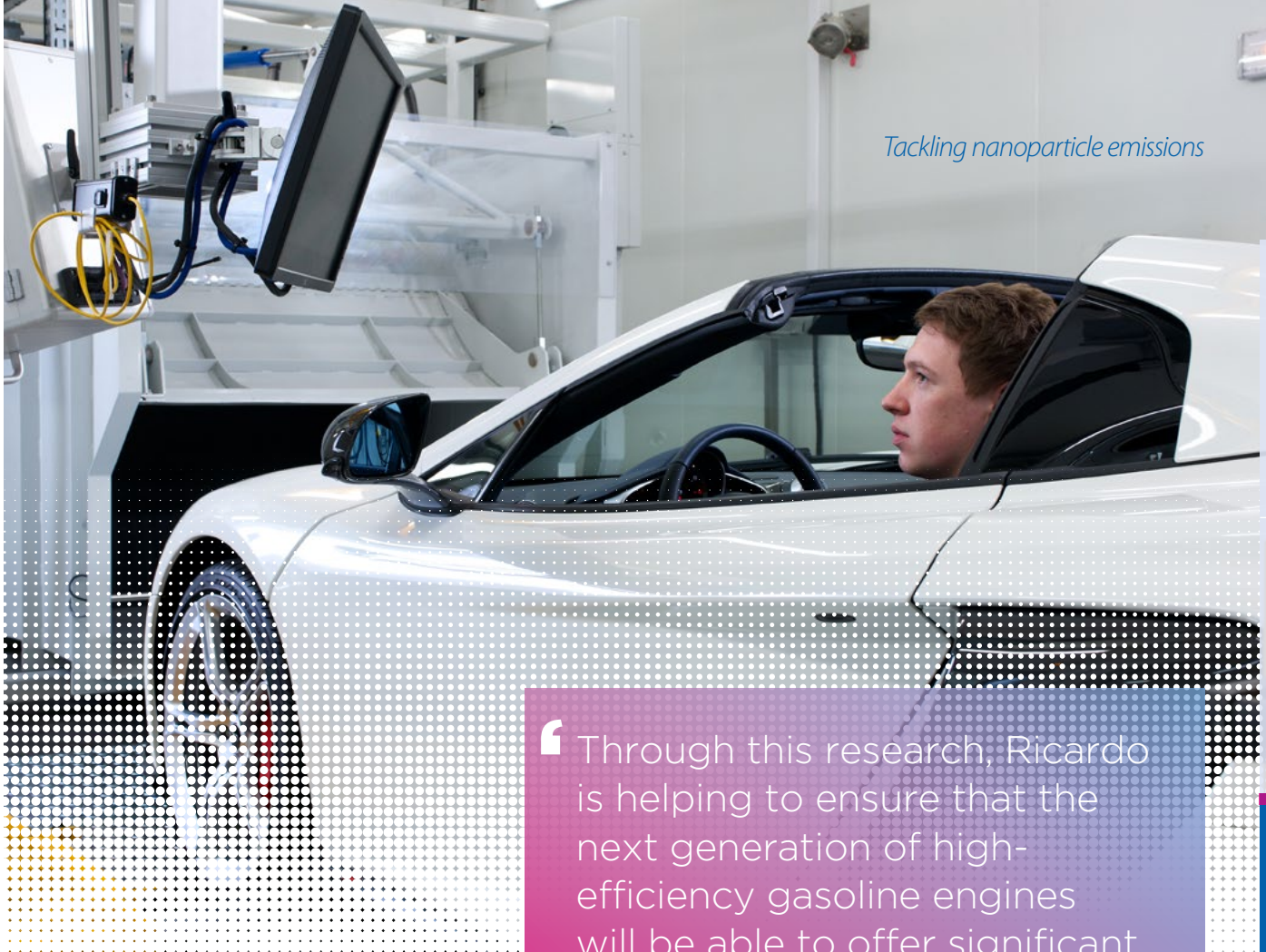
With DPFs now standard equipment for diesel vehicles (and proving effective in capturing down to the very smallest of nanoparticles) the concern over sub-23 nm particle emissions revolves principally around emissions from the latest generation of gasoline-powered vehicles. This concern relates to a fundamental change in the way that non-combustible compounds are emitted.

As a general rule, the more efficient a gasoline engine's combustion process, the less soot it produces. This soot is emitted by the engine in the form of 'agglomerates' averaging 80-100 nm in size, which also include compounds such as metal oxides that arise from the non-combustible components of the fuel and lubricant additive packs, and engine wear. These compounds of elements such as zinc, phosphorous and calcium frequently appear as particles as small as 10 nm, but they effectively attach to the surface of abundant larger soot agglomerates.

The concern with future high-efficiency gasoline combustion is thus that as engine fuel efficiency increases, the lower level of soot will result in much larger numbers of these near-10 nm particles being emitted independently.







### Demonstrating the challenge

To investigate the level of sub-23 nm particles emitted by a typical current production gasoline powered car, Ricardo worked with industry body, the Association for Emissions Control by Catalyst ('AEC') on a project in which measurements of gases and PN were recorded on the road over a real driving emission ('RDE') cycle. These RDE measurements were then duplicated in the vehicle test laboratory yielding two sets of highly accurate PN measurements, taken at sizes down to just 7 nm and above 23 nm, both with and without a gasoline particulate filter ('GPF') fitted to the vehicle.

The results of this work clearly demonstrated that despite the test vehicle satisfying current particle emission regulations which measure particles from 23 nm upwards, without the GPF the emissions frequently exceeded the  $6 \times 10^{11}$  particles per km limit when the threshold was lowered to 7 nm. The reason for this was that in terms of numbers of particles counted, approximately 20 to 25 per cent of the total was emitted in this lower range, which is below the current threshold of regulation.

### Further research

With widespread and increasing concern over the health consequences of nanoparticle emissions, the European Commission is supporting Ricardo and other researchers, including the PMP group, in further investigations into measurement technologies, systems and methodologies that might support a lowering of the current particle size threshold.

“ Through this research, Ricardo is helping to ensure that the next generation of high-efficiency gasoline engines will be able to offer significant advances in fuel efficiency, while avoiding the potential health risks of nanoparticle emissions”

Ricardo is an active participant in the three-year 'Down To 10' project, the main thrust of which is to consider the application of both condensation particle counter and diffusion charger methods of particle counting, representing methods that are applicable to test laboratory, RDE and onboard diagnostics system requirements.

Work on the Down To 10 project has only just started, but it builds upon previous efforts by Ricardo and the PMP team examining sub-23 nm particle emissions, as well as the 15 or so years of research that led to the original regulatory regime that has been so effective in reducing the particle emissions of modern diesel engines. With the proactive approach being adopted by the European Commission, the work of Ricardo and its PMP partners is aimed at providing a modified framework for measurement and regulation of sub-23 nm nanoparticle emissions.

Through this research, Ricardo is helping to ensure that the next generation of high-efficiency gasoline engines will be able to offer significant advances in fuel efficiency, while avoiding the potential health risks of nanoparticle emissions.



*Charge of innovation*







# CHARGE OF INNOVATION

*Ricardo is helping to pave the way for a new, lighter-weight and safer lithium-sulfur based rechargeable battery chemistry – an innovative technology that aims to overcome the cost, capacity and safety challenges of today’s lithium-ion based systems*

One of the major challenges holding back the market penetration of battery electric vehicles (‘BEVs’) is today’s high cost of rechargeable energy storage. Battery systems represent a very significant cost element of a typical BEV, meaning that manufacturers need to strike a balance between product affordability and available range between recharges.

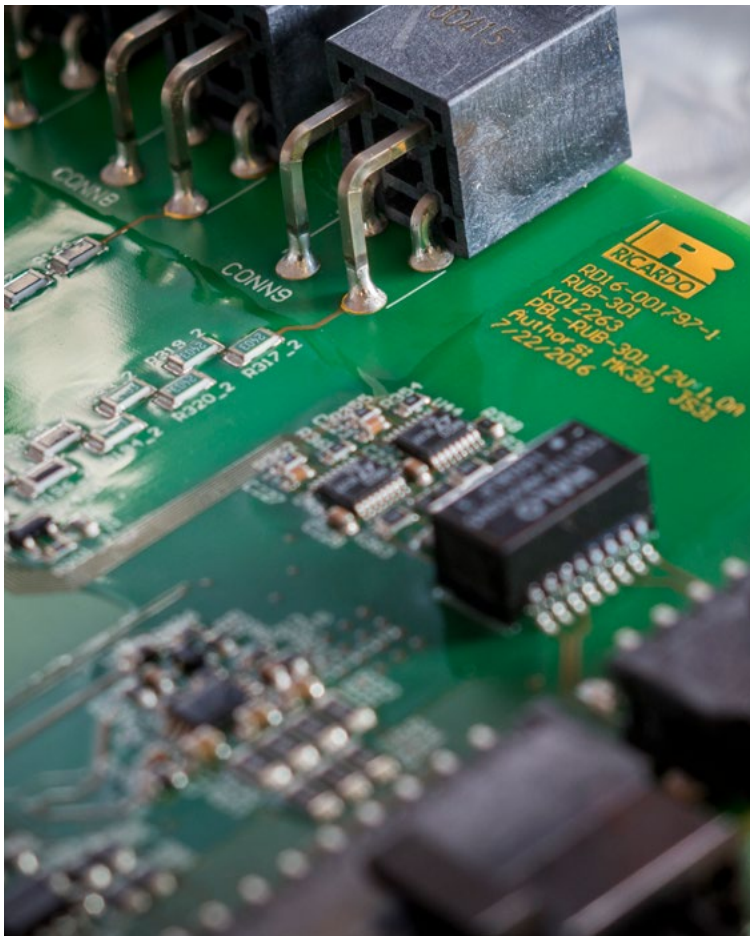
The consequence of this high cost of battery systems is that BEVs are at present restricted to exploiting market niches – in particular the markets for small, urban commuting vehicles, and for larger, high-end sedans and SUVs equipped with high-capacity batteries whose costs are more readily absorbed within these luxury vehicle types.

For BEVs to break out beyond these niches is likely to require the development and refinement of battery technology based on entirely new, more affordable, and lighter-weight cell chemistries than those used

in today’s lithium-ion (‘Li-ion’) based battery packs. Moreover, a further objective is to improve safety by adopting cell chemistries that avoid the well-publicised propensity of Li-ion packs for thermal runaway in the event that they sustain physical damage.

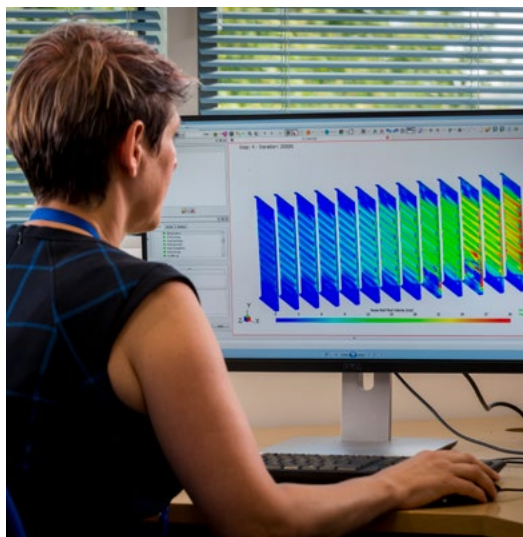
### **Exploring the potential of lithium-sulfur**

In partnership with Imperial College London and Cranfield University, Ricardo’s hybrid and electric systems team has been actively participating in a joint research project with OXIS Energy to investigate the potential vehicle application of the latest concept in lithium-sulfur (‘Li-S’) cell technology developed by OXIS. Li-S cells offer the potential for lighter-weight and lower cost energy storage, potentially allowing a greater depth of discharge than today’s Li-ion systems while at the same time considerably reducing the risk



of thermal runaway. With part funding from Innovate UK, the project, under the name Revolutionary Electric Vehicle Battery ('REVB'), aimed to evaluate the potential of the OXIS Li-S cells by developing a battery module and Battery Management System ('BMS') that would be appropriate for an automotive application.

To bridge the gap between a promising new cell chemistry and verifying it for a given application is, in its own right, a considerable engineering endeavour. In order to be able to create a viable battery pack



design, the individual cells need to be understood in terms of their thermal, mechanical and electro-chemical properties. In addition to meeting external packaging envelope restrictions, the pack needs to be engineered to be capable of securely housing the individual cell pouches, while also allowing for expansion and contraction, and providing the requisite thermal management of the cells through its cooling system.

In addition to the engineering task of creating the pack design, a further higher level challenge is represented by the required control technology. In common with existing products, the entire Li-S pack needs to be managed by the BMS, which is optimised for the cell chemistry as well as for the design of the cell modules forming the pack and the application for which the battery is to be used.

### Ricardo battery management systems expertise

Key Ricardo responsibilities in the REVB project derived from the Group's long-standing industry leadership in battery pack design and BMS control technology. The control of new cell chemistries can require a far greater level of sophistication than that needed for current products, so the opportunity was taken to significantly increase the available computing power of the previous generation of Ricardo BMS by almost an order of magnitude, from approximately 90 to 800 million instructions per second.

This increase in capacity enables the adoption of highly sophisticated model-based battery management. This model-based approach enables the BMS to control the cells based on parameters that might be impractical or impossible to measure. For example, while the exterior temperature of a cell might easily be measured, it is the internal temperature that is crucial for control purposes. But if a mathematical representation of the cell is used, which combines the external temperature with a prediction of internal heat rejection based on the chemical and electrical performance, a far more accurate prediction of the instantaneous temperature within the cell could be possible.

By adapting and using mathematical algorithms supplied by Cranfield University to describe the electrical and chemical performance of the cells, Ricardo was thus able to optimise the BMS operation of the battery to make best use of the performance of the Li-S cells. To maximise its potential use beyond the REVB project, the improved Ricardo BMS has been designed so as to provide a flexible and future-proofed architecture that will enable the development of control systems based on all new-technology battery packs, regardless of their cell chemistry.



### Optimised pack design

To assess the potential of the Li-S cells in a typical automotive BEV battery pack, Ricardo also created the design of an individual module which might be assembled to form such a pack. This work required particular attention to the high level of physical expansion and contraction of this generation of Li-S cells as well as the development of the battery module cooling system and thermal management strategy.

Computer-aided Engineering ('CAE') methods were employed extensively in the design of the battery module, including the use of the Ricardo VECTIS computational fluid dynamics package, which was modified to enable a conjugate heat transfer analysis of the battery module and its cooling system. This approach enables the simultaneous solution of both the structural and fluid heat transfer calculations, providing a far more accurate prediction of the product's thermal and fluid dynamic performance.

The final design of the battery module combined the mounting of the individual cells into a backing plate assembly, which doubled as part of the thermal management system, maintaining the desired operating temperature of the individual cells.

Having engineered the upgraded Ricardo BMS and purpose-designed battery module, Ricardo constructed a total of five proof-of-concept 'A-samples' of both the BMS and battery module for testing. This work broadly confirmed the potential of the OXIS Li-S cell chemistry to achieve the target of 400 Wh/kg capacity.

### Commercial interest

The REVB project clearly showed the functional potential of the OXIS Li-S cells for vehicle applications. In their current stage of development, while OXIS Li-S cells offer a low-weight solution, their comparatively larger size than current alternatives could make their application more attractive in large vehicles such as buses, where package space is less restricted than in passenger cars.

Together with the continued progress on automotive BEV development, Ricardo's work on the REVB project demonstrates the Group's industry-leading capability to assist with the crucial enabling control technologies and innovative application expertise – know-how that can help bring forward the deployment of next-generation battery cell chemistries.

In this way, Ricardo is helping the automotive industry to move closer to the long-awaited breakthrough point at which battery-electric traction approaches commercial parity with combustion engine-based powertrains.





*Semi-autonomous semi truck*





# SEMI-AUTONOMOUS SEMI TRUCK



*Ricardo has been assisting the Texas A&M Transportation Institute in creating and demonstrating technology to improve the safety and productivity of the ubiquitous North American 'semi trucks' – the Class 8 articulated tractor-trailer combinations that ply the US Interstate network delivering the goods and materials that are the life-blood of the American economy*







Previous Ricardo experience in the development of platooning technology includes the European SAfe Road TRains for the Environment ('SARTRE') project which concluded in 2012

Ricardo has developed an enviable reputation as a leading innovator and technical partner for semi-autonomous vehicle platooning, where an experienced driver in a lead vehicle is also responsible for a train of multiple following vehicles. This concept offers significant advantages for long-haul truck applications. Firstly, as there is almost instantaneous reaction time between the application of braking demand on the lead vehicle and that on the entire platoon, it offers improved safety. This faster reaction time enables the inter-vehicle distance to be closed up, considerably improving both the aerodynamics and hence, fuel economy and CO<sub>2</sub> emissions of the trucks in the platoon. Previous work has demonstrated that with truck platooning, these fuel and CO<sub>2</sub> savings can be as high as 8 per cent for the lead truck, and 16 per cent for following vehicles.

But these are far from the only potential advantages of truck platooning. The operation of platoons would also improve road space utilisation, enabling more free-flowing traffic on congested routes and potentially avoiding the requirement for significant capital investment in infrastructure upgrades. In the future, platooning might also enable the drivers of the platooned vehicles following the leader to enjoy some level of partial rest credit. This would not only lower costs and improve productivity but might also help in regions where skilled and experienced truck drivers are in short supply.

#### **A proven track record in platooning**

In 2012, Ricardo worked with a European partnership including Volvo on the SAfe Road TRains for the Environment ('SARTRE') project, which demonstrated a platoon comprising three cars and two rigid-chassis trucks, the first of which was the lead vehicle

controlling the entire platoon. In 2016, Ricardo's North American engineers built upon this already proven experience to develop a platooning application for the largest class of American trucks. In a project sponsored by the Texas Department of Transport, Ricardo was contracted to support the Texas A&M Transportation Institute ('TTI') to demonstrate platooning based on two heavy-duty Class 8 tractor-trailer trucks. This work would go further than many previous platooning demonstrations in that the following vehicles would be subject to both lateral and longitudinal control, providing automated steering, acceleration and braking without driver input.

In the first phase of the work, Ricardo was responsible for system integration and software development of the platooning system for the two-truck platooning project. Ricardo engineers led a team of suppliers in conjunction with TTI, integrating their hardware and developing software that would be deployed on the two Class 8 trucks. The team integrated dedicated short range communication ('DSRC'), steering and braking actuation, and speed controls. The team also developed key software algorithms for sensor fusion, platooning management and both lateral and longitudinal motion control.

#### **Platoon control**

The platooning manager algorithm developed by Ricardo automatically assesses distance, speed and user inputs for both vehicles, and allows the following vehicle driver to be 'hands off, feet off and eyes on'. In effect, therefore, the following vehicle driver is required only for emergencies or to resume control once platooning is finished. The longitudinal algorithm was developed to control acceleration



and braking, and to regulate the following distance 'gap' between the trucks. The lateral algorithms control the steering to allow the following vehicle to track the path of the lead vehicle. At the current phase of development, the following vehicle can autonomously follow the lead vehicle and perform a lane change manoeuvre or a figure of eight, while maintaining autonomously the desired inter-vehicle gap and platoon speed.

Ricardo integrated the vehicle-to-vehicle (V2V) technology to serve as the communication link between the lead and following vehicles. This allows the trucks to seamlessly communicate critical safety data and information in real time. When combined with a Human Machine Interface (HMI), this allows the platooned trucks to demonstrate a precisely controlled inter-vehicle gap that can be specified between 5 and 70 metres.

The HMI is used to determine if and when the vehicles can form and platoon, and also when the platoon is to be dissolved. The platoon is formed by the lead vehicle accepting a request to platoon by a suitably equipped following vehicle. Once the lead vehicle has accepted the platoon request, by selecting the 'join platoon' button on the HMI, the following vehicle – and subsequent vehicles wishing to join – are able to form the platoon.

### Sensor technologies

The platooning system was based on multiple radar, camera, and other sensors in each vehicle, as well as a safety controller. The V2V architecture provides for the full communications requirements of the platoon, enabling the vehicles to share data and information to help the following trucks in the platoon respond in the appropriate way.

Ricardo called on its extensive experience in simulation and testing to evaluate all aspects of the

demonstration vehicles throughout development to ensure the systems would perform as expected. The final demonstration was conducted on the Texas A&M University System's RELLIS Campus in the summer of 2016, when the two-truck platoon performed several manoeuvres, including a figure of eight, at speeds of up to 50 mph (80 km/h).

The project with TTI is part of a multi-phase initiative. Having demonstrated the platooning technology at the RELLIS Campus, Ricardo and its partners are now progressing work on the second phase, which will see the system being updated to handle public road trails, including manoeuvres such as merging and lane changing.

### Stepping stone to full autonomy

The platooning of large vehicles, both on long-distance public highways as well as in the form of captive fleets such as mining vehicles, represents perhaps the most attractive early application of automated driving corresponding to the higher levels 3-5 of autonomy as defined in SAE International standard J3016. Subject to appropriate regulation, this is a technology which appears to be close to market readiness, and promises significant societal and environmental benefits.

Ricardo is already a leader in the development of connected and autonomous vehicle technologies, and with its proven experience with some of the highest profile platooning demonstration projects on either side of the Atlantic – which now includes the highest class of heavy-duty trucks – the Ricardo Group is well positioned to assist customers with the future automation of commercial vehicle fleets. In this way, the freight transportation networks of the future can be more efficient, more productive, and more environmentally sustainable.





*Shipping steers a clear course on emissions*





Shipping steers a clear course on emissions



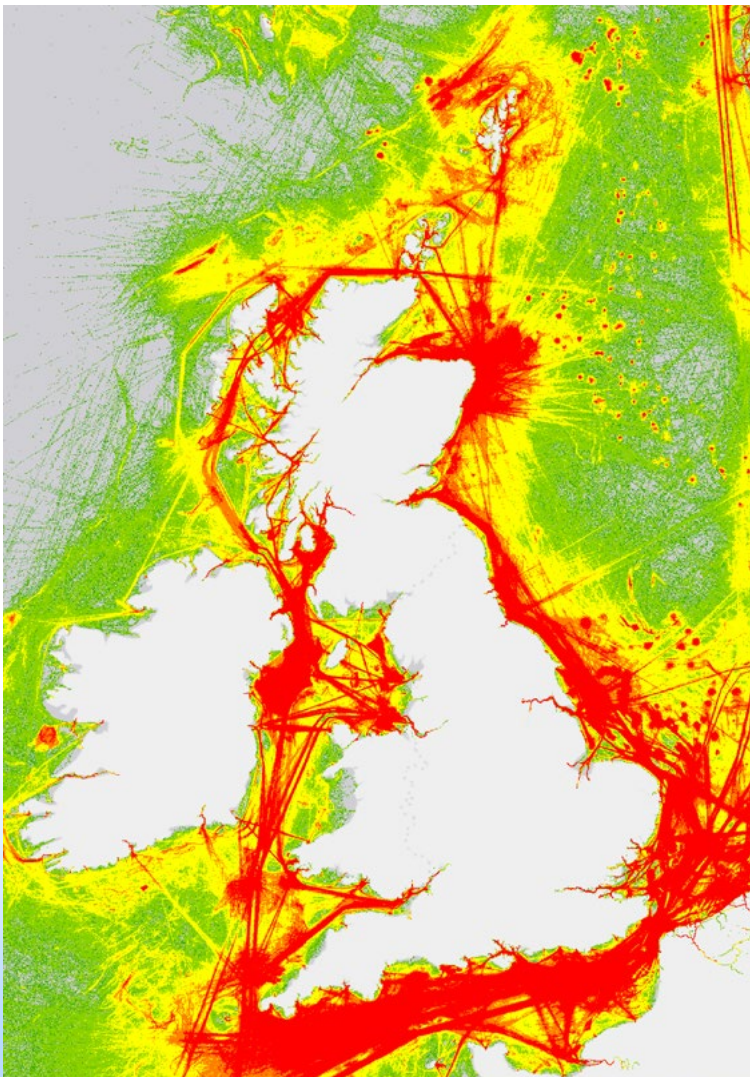
# SHIPPING



# STEERS A CLEAR COURSE ON EMISSIONS

*With pollutants and greenhouse gas emissions from shipping seen as a significant and growing part of global emissions, Ricardo has been commissioned to deliver a comprehensive update of the shipping emissions inventory for the UK National Atmospheric Emissions Inventory*





**Position density of AIS Class A shipping around the UK**

Data generated for the shipping emissions inventory shows clearly the concentrations of movements around the UK's major ports and through the English Channel

Under the 2015 Paris Agreement on Climate Change, some 200 countries agreed to establish and report their individual national greenhouse gas ('GHG') emissions inventories as the first step towards applying targeted reductions. For the UK, this is the National Atmospheric Emissions Inventory ('NAEI') and is coordinated by Ricardo Energy & Environment.

Although the reporting obligations cover domestic shipping, they do not need to include international shipping. For some nations – especially island states such as the UK that are on busy shipping lanes – the reporting of purely inland sources is insufficient to provide a complete picture of atmospheric pollutants.

Such is the intensity of shipping around Britain, through the English Channel and around some UK ports, that emissions that occur at sea are likely to have a significant effect on air quality in coastal communities on land; they can make a sizeable contribution further inland too.

Although the existing UK inventory of shipping emissions is reasonably detailed, it does not cover several important classes of shipping activity. What is more, levels of shipping activity are forecast to rise significantly in the coming years as global trade expands. For these reasons, Ricardo Energy & Environment was commissioned by the UK Government to undertake an update of the shipping emission inventory component of the NAEI.

The NAEI is an especially useful resource as it is spatially disaggregated to a very high resolution, meaning that it shows the distribution of emissions from each sector and emission source; this makes it a vital tool for local air quality modelling.

Ricardo's new analysis, in conjunction with project partner University College London Consultants, has addressed several drawbacks to the existing UK maritime inventory – principally that they were based on estimated rather than actual routes taken by ships, that they did not take account of variation in vessels' engine loads or speeds, and that they failed to capture certain types of craft, especially fishing vessels, offshore fleet and service vessels.

Reviewing the available options, Ricardo and its partners opted for an entirely new methodology relying on Automatic Identification System ('AIS') data from the UK's Maritime and Coastguard Agency. In addition to identifying and tracking individual vessels, AIS messages also provide information on speed, draught and other parameters. This enables very precise plotting of ships' courses and speeds.

The ships' identities are then cross-referenced to a register of world shipping containing technical details for the majority of the world's registered vessels over 100 gross tonnes. Marrying the two streams of data together enables the model to predict the emissions of any AIS-tracked vessel with a high degree of accuracy and at any given speed and load condition; even when in port or at anchor, the emissions of the ship's auxiliary engines and boiler are accounted for.

The only drawback of this approach is the enormous amount of data that it generates. The 2014



survey data for all the vessels around the UK, each reporting up to every three seconds, resulted in more than 2 billion data points. This meant the data had to be thinned down to around 100 million AIS messages, but it was still a considerable data processing task.

The new model estimates the emissions to air of greenhouse gases (carbon dioxide, methane and nitrous oxide), sulfur dioxide, nitrogen oxides, particulate matter, carbon monoxide and volatile organic compounds. The 2014 inventory has so much detail and so many layers that it can serve as a starting point to model future forecasts as well as a basis for 'back-casting' to earlier years to provide historical emissions inventories which also have to be reported. This same data, overlaid with estimates of the improvements in engine efficiency over time and changes in the fuel type driven by legislation, can be used to generate accurate forecasts for future years.

Given the success of the inventory capture rate around the UK coast and through the English Channel, a natural next step would be to extend the scheme further afield. The reach of the data gathering is effectively only limited by the range of terrestrial AIS receivers, and the use of satellite AIS data could potentially be added to widen the system's operating radius. The system already estimates emissions for the UK fishing fleet even after these vessels travel a long way out of terrestrial AIS range before returning to land their catch in the UK; emissions for the whole trip can be calculated and included.

The multi-layered emissions inventory will be a very valuable resource on a technical level and also from a planning perspective. Future environmental measures could be modelled and their effects predicted with some degree of confidence; this could be done relatively simply by changing some of the assumptions in the existing forecasting models.

Forecasts have already been completed as far into the future as 2035 to model the effects of projected changes in shipping activity, transport efficiency, fuel types and emission factor improvements.

Yet one thing is abundantly clear. Despite the greater coverage of smaller craft, such as tugs, service vessels and passenger ships that are now included in the emissions inventory, as far as the UK is concerned it will still be the larger vessels that are the dominant source of emissions. And in contrast to domestic traffic, which has remained roughly level since 2009, international movements are on an upward trend.

According to estimates from the International Maritime Organisation ('IMO'), shipping accounts for between 2 and 3 per cent of global man-made CO<sub>2</sub>. The IMO has put into place efficiency improvement measures for categories of shipping responsible for 85 per cent of maritime CO<sub>2</sub> emissions, but even on a business as usual basis the same organisation forecasts that, by 2050, CO<sub>2</sub> from international shipping could have grown by between 50 and 250 per cent to as much as 2,500 million tonnes a year – which gives a chilling idea of the scale of the problem.

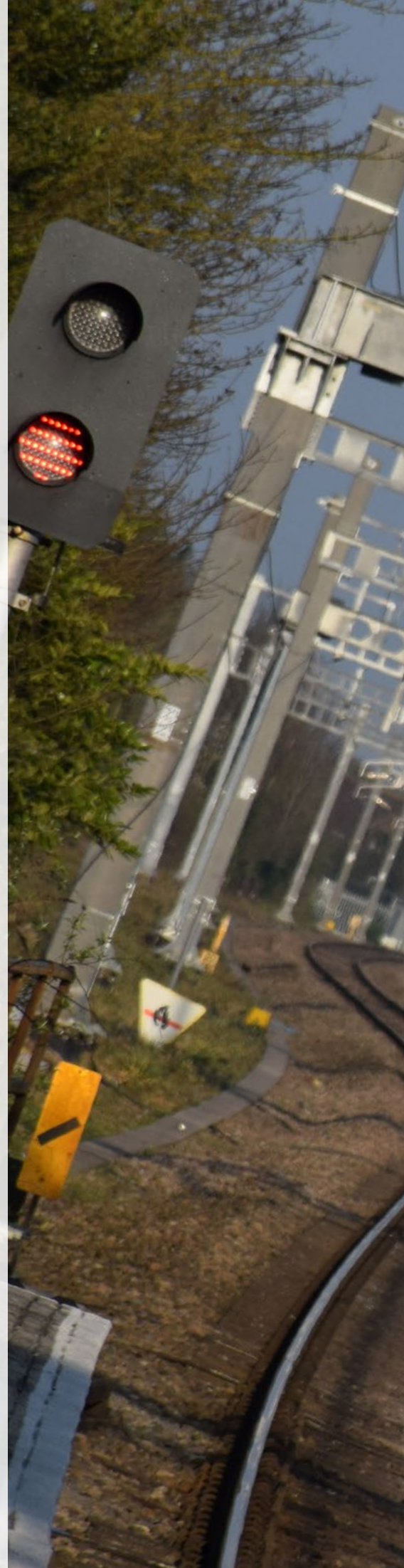
The Ricardo maritime air quality project thus comes in the context of growing international concern over pollution at sea, be it in the atmosphere or in the water. In addition to the work by the Company's air quality specialists, therefore, Ricardo Energy & Environment's water practice is also ideally placed to offer expertise in areas including the monitoring of port water quality for environmental permit compliance, while the Group's Technical Consulting business can offer specialist expertise at the forefront of innovation in marine propulsion engines and auxiliary power systems.



# SMART MONITORING



*Already approved by Network Rail for the UK main line, and under evaluation by Belgian national rail infrastructure manager, InfraBel, Ricardo's PanMon pantograph monitoring system aims to improve the reliability of electrified routes and protect critical infrastructure*





Plans to install *PanMon* systems to protect the Heathrow airport spur and at further locations on the WCML are now progressing, with potential further applications on many other UK electrified mainlines





Over recent years, electrification has been fundamental to the improvement of rail services across Europe. In 1990, less than a third of Europe's railways were electrified. Today, more than half of its lines are electrified – including routes that carry around 80 per cent of traffic.

The favoured electrification solution, especially where higher speeds and longer distances are involved, is achieved via high-voltage overhead line equipment ('OLE'), where trains pick up their

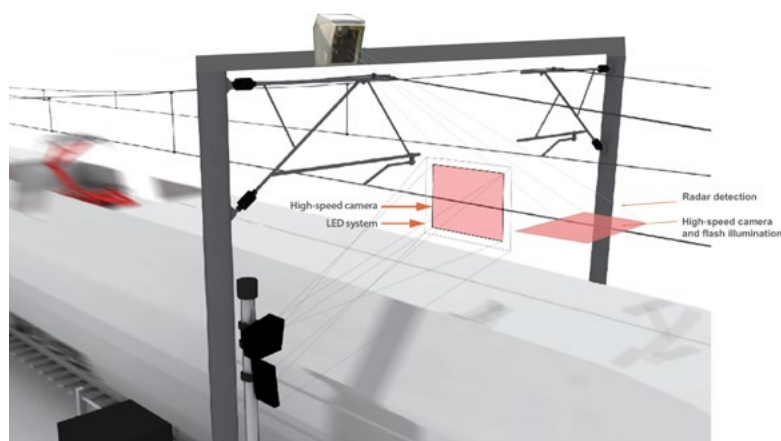
power through roof-mounted pantographs tipped with contacts that slide along the underside of an overhead contact wire.

The crucial interface in this system is that between the pantograph and contact wire. Poorly maintained or damaged pantographs can be a significant cause of so-called 'dewirement' incidents, where snagging can incur extensive damage to the electrification infrastructure. Though infrequent, such incidents can lead to extensive and costly disruption to rail services, in some cases costing multiple millions of pounds in repairs and in 'performance regime' payments. These are the rebates paid to train operators in lieu of infrastructure-related delays.

To help tackle this issue, Ricardo Rail engineers have developed *PanMon*, an innovative system that uses highway enforcement (speed camera) technology to continually monitor the pantographs of passing trains, automatically identifying incipient problems. The system then provides engineers with real-time warnings that enable them to take corrective action before further wear and tear causes more serious damage to the infrastructure.

As with many successful monitoring innovations, *PanMon* represents a combination of existing sensing technologies, working with smart analysis software and real-time processing and reporting. The system includes a high-speed camera system, provided by the Sensys Gatso Group, that is fitted to a gantry immediately above the running rails and contact wire. These cameras then capture high-speed digital images of each passing pantograph.

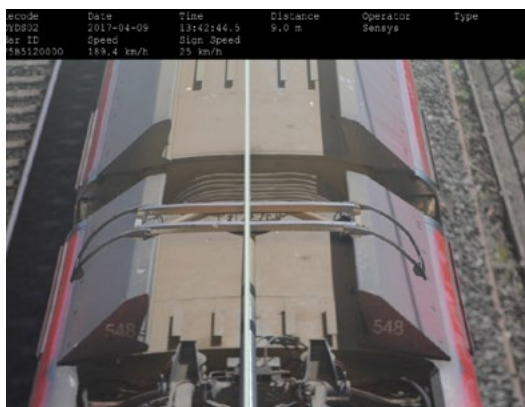
In addition to the Sensys camera, the *PanMon* system uses a high-speed video camera provided by DMA, a provider of trackside monitoring technologies based in Italy. These cameras are mounted at pantograph height on a mast alongside the rails and capture the uplift of the contact wire as each pantograph passes, using LED lights to illuminate the video sequence. Finally, a tag reader identifies each carriage of each passing train, such that any fault can be immediately traced back to a given vehicle and individual pantograph.



### Automatic analysis

As each *PanMon* installation captures high-speed photography and video of passing pantographs, it uses specialist software to rapidly process the images and characterise the condition of each passing pantograph. The first task is to correct for the perspective and view angle of the camera: this enables an orthogonal representation of the pantograph to be constructed from the image. The software then compares the captured image against a library of types and designs of pantograph known to pass the location, followed by an assessment





for any physical damage, such as broken or bent structural components that might pose a risk of snagging the contact wire or its catenary support. Such damage can be caused by vandalism or where maintenance equipment has been erroneously left in place. *PanMon* can then immediately identify any risk of consequential dewirement – for example, at a junction or a points/switch location where the train crosses between lines.

At the same time, *PanMon* will assess the wear on the carbon strip inserts of the pantograph. Here the system looks for both the general level of wear – should a replacement be considered at the next planned depot inspection, for example – and identifies whether any localised damage has occurred in the form of chipping, which might risk snagging the contact wire.

Finally, the video is analysed for the uplift of the contact wire as the pantograph passes, and for its dynamics as the wire re-settles. Pantographs generally apply upward force either through a spring-loaded or pneumatic system, or a combination of both: *PanMon* can be programmed to take account of local conditions, and provide warnings if the uplift exceeds design limits.

Fault notification from a *PanMon* installation can be provided in almost real time. In extreme cases where there is an imminent risk of dewirement occurring, the network control centre might be alerted to halt, at the next available opportunity, a train showing a fault. It would then either withdraw it from service, lower the offending pantograph of a multiple-unit train, or switch pantographs on a high-speed train. Conversely, less severe damage might instead be flagged for the next scheduled maintenance.

### Commercial interest

The UK rail infrastructure manager Network Rail was the first customer to recognise the potential of *PanMon* to deliver reliability improvements and cost savings. Following an initial installation at Cheddington on the West Coast Main Line ('WCML'), Network Rail formally approved the use of *PanMon* for



application across the whole UK national rail system – a highly significant step as *PanMon* remains the only such system certified for use by a major network operator.

Plans to install *PanMon* systems to protect the Heathrow airport spur and at further locations on the WCML are now progressing, with potential further applications on many other UK electrified mainlines.

In Belgium, the national rail infrastructure manager, InfraBel, is also in the process of evaluating the system with a view to an eventual certification of *PanMon* for the national network. Work is now ongoing to develop the software-based library of pantograph types and fault analysis to capture the requirements of the Belgian system.

Ricardo Rail enjoys a unique position in the international rail sector in that its engineers have detailed knowledge of both rolling-stock and infrastructure systems, as well as day-to-day operational and maintenance concerns. As such, *PanMon* is just one of a range of innovations based upon real-time condition monitoring, automated analysis, and reporting that Ricardo is now developing.

Collectively, these intelligent systems can help rail infrastructure and operations businesses to manage safety-related risks in real time, and to develop improved asset management and cost-effective maintenance processes. In this way, Ricardo can make a significant contribution in improving international railway reliability while also driving down costs.

**Installation of *PanMon* on the West Coast Main Line ('WCML') in the UK (above), and high-speed image capture of a passing pantograph (above left)**

*Ultimate performance*

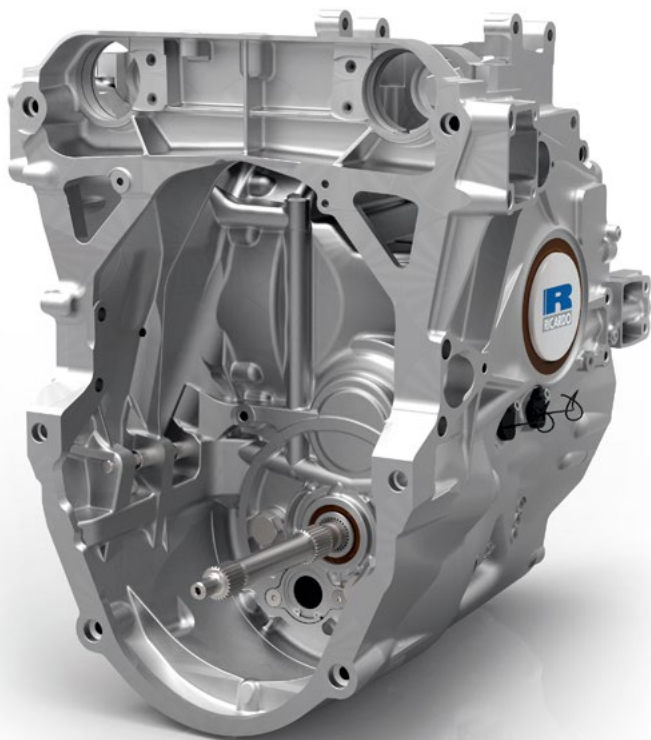






# ULTIMATE PERFORMANCE

*Ricardo's brand and reputation for the design and manufacture of advanced driveline systems for the world's very fastest, most luxurious and most exclusive sports cars is already beyond question. And now, in partnership with Aston Martin, the Performance Products Division is creating the seven-speed transmission for the truly spectacular Aston Martin Valkyrie*



The Aston Martin Valkyrie is an ultra-high performance hypercar and the product of a unique innovation partnership between Aston Martin and Formula One's Red Bull Racing, combining the vision and skills of two world-leading brands to create a road car the like of which has never been seen before. The Aston Martin Valkyrie is a car engineered to be entirely usable and enjoyable as a road car, but with the capability to perform on a race track like no car before it. One hundred and fifty roadgoing examples will be built, with 25 track-only versions to follow. First deliveries are due to start in 2019.

Building upon its strong reputation in the design, development and manufacture of advanced transmission and driveline systems for some of the world's highest performing supercars, Ricardo has been selected as technical and supply partner for the transmission of the Aston Martin Valkyrie. This prestigious contract follows on from previous high-profile projects which have seen the Performance Products Division create high-performance transmissions for Bugatti, Ferrari, Jaguar, McLaren and Porsche.

The new bespoke seven-speed paddle-shift transmission is being designed and manufactured by Ricardo in accordance with the demanding specifications, channelling the huge power of the Aston Martin Valkyrie's 6.5-litre naturally aspirated Cosworth V12 engine. Conforming to the hypercar's





ethos of minimal mass and maximum efficiency, and led by Red Bull Advanced Technologies' simulation work, Ricardo will deploy intelligent engineering solutions to achieve the vehicle's uncompromising goals. Ricardo's responsibilities include both mechanical design and control software development as well as manufacture.

The combination of features in this advanced transmission has resulted in a unique design, driven by the need for uncompromised performance and calling on the full breadth of knowledge Ricardo has developed over its long, proud and successful history in motorsport and performance driveline technology.

To deliver such a demanding project, Ricardo combined its best talents from both its motorsport and road transmission design teams into a new dedicated and highly skilled project team especially for the Aston Martin Valkyrie programme. Technical reviews with both Aston Martin and Red Bull have driven numerous innovations, with the key drivers being the smallest possible package in terms of space and weight, at the same time as achieving the quickest possible shift times with no compromise given to durability or driver engagement.

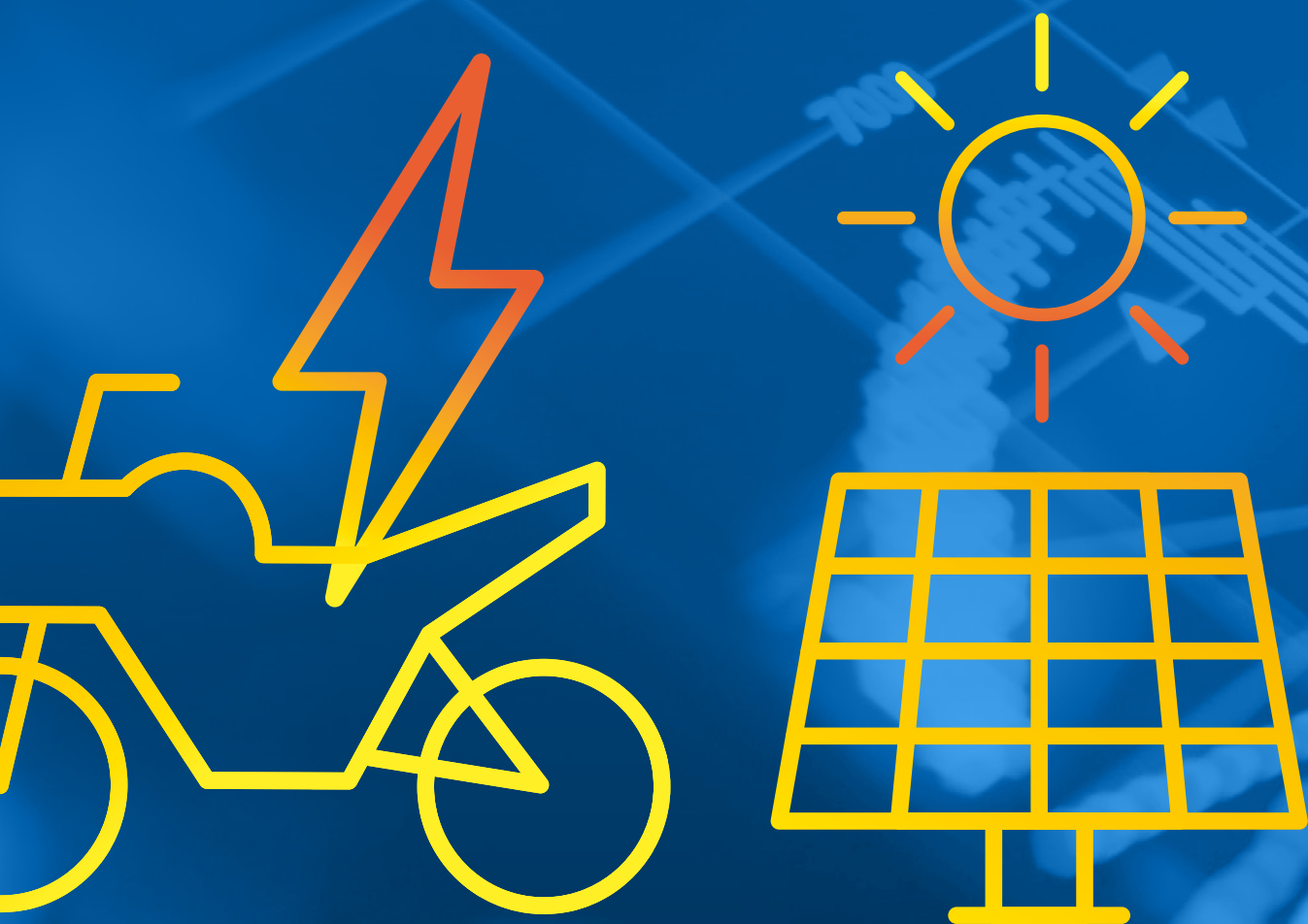
The result is a transmission that is a state-of-the-art blend between race-car performance and road-car manners; the design's seven sequentially shifted forward ratios have been closely matched

through real-world lap time simulation to give optimum performance. Among the circuits used in the simulation was one of Europe's most modern Formula One venues, the Circuit de Barcelona-Cataluña.

The advanced manufacturing facilities of the Ricardo Midlands Technical Centre will be used from the prototype stage through to production-intent transmissions. These will undergo exhaustive mechanical test and control system development prior to the final design released for series production in 2018.

Following a similar approach to the many other high-profile extreme-performance car transmission projects delivered previously by the Performance Products Division, Ricardo will continue to be closely involved throughout this prestigious vehicle's life. Aston Martin Valkyrie transmissions can be returned through Aston Martin to undergo servicing by Ricardo to precisely the same high standards and in the same advanced manufacturing environment in which they were originally built. In this way, Ricardo ensures that its performance manufacturing clients – and their own valued customers – are supported throughout the life of some of the most impressive, high performing, innovative and exciting cars ever created.

# Corporate governance







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## Board of Directors



**Patricia Ryan**  
*LLB (Hons)*  
**Group General Counsel  
and Company Secretary**

Patricia Ryan is a qualified solicitor. She joined Ricardo's legal department in 2002 and was appointed Group General Counsel in 2005 and Company Secretary in November 2008. Patricia holds an honours degree in law from the University of Westminster. Patricia achieved the Certificate of Investor Relations from the Investor Relations Society in February 2017.

**Laurie Bowen**  
*BSc, MBA*  
**Non-Executive Director**

Laurie Bowen was appointed Non-Executive Director on 1 July 2015. Laurie has over 30 years of international leadership experience at IBM, British Telecom, Tata Group and Cable and Wireless Communications. She now serves as CEO for Telecom Italia Sparkle Americas and is based in Miami, Florida. Laurie has an MBA, a BSc in Electrical Engineering and a BSc in Computer Science from Washington University in St. Louis, Missouri.

**Peter Gilchrist**  
*CB*  
**Non-Executive Director,  
Senior Independent  
Director and Chairman  
of the Remuneration  
Committee**

Peter Gilchrist was appointed Non-Executive Director on 1 December 2010, Chairman of the Remuneration Committee on 14 November 2013 and Senior Independent Director on 1 July 2015. Peter's military career spanned almost four decades in the British Army and has previously been Master-General of the Ordnance and an executive director in the Defence Procurement Agency. Peter is currently non-executive chairman of Enterprise Control Systems Limited, the board of trustees of The Tank Museum and is a non-executive director of Push Technology Limited.

**Mark Garrett**  
*CEng, FIMechE, FREng*  
**Chief Operating Officer**

Mark Garrett joined Ricardo in 1998 and was appointed Chief Operating Officer in 2010. Prior to joining Ricardo, Mark spent 14 years in various powertrain related roles in the Rover Group, including the BMW Engineering Centre in Munich. Mark is a Chartered Engineer and a Fellow of both the Institution of Mechanical Engineers and Royal Engineering Academy. Mark was also appointed as non-executive chairman of SBD Automotive on 28 November 2016.

**Sir Terry Morgan**  
*CBE, FREng*  
**Non-Executive Director  
and Chairman**

Sir Terry Morgan was appointed Non-Executive Director on 2 January 2014 and Chairman on 29 October 2014. He is currently non-executive chairman of Crossrail Limited, the Manufacturing Technology Centre and the National Skills Academy for Railway Engineering. He was previously a non-executive director of Boxwood Limited and the Department of Energy and Climate Change.





**Dave Shemmans**  
BEng  
Chief Executive Officer

Dave Shemmans joined Ricardo in 1999. He was appointed to the Board as Chief Executive Officer Designate in February 2005 and became the Chief Executive Officer of Ricardo plc on 4 November 2005. Prior to joining Ricardo, he was operations director of a subsidiary of PowerGen plc. He has also gained consulting experience in both listed and private companies. He is a graduate of the Harvard Business School. Dave was appointed non-executive director of Sutton and East Surrey Water plc on 1 September 2014.

**Ian Gibson**  
BSc, ACA  
Chief Financial Officer

Ian Gibson was appointed Chief Financial Officer on 1 July 2013. Ian is a Chartered Accountant, previously with Deloitte. He is a highly experienced finance professional with more than thirty years of commercial experience, previously as chief financial officer of Cable & Wireless Worldwide plc.

**Malin Persson**  
MSc  
Non-Executive Director

Malin Persson was appointed Non-Executive Director on 4 January 2016. Malin was employed by the Volvo Group between 1995 and 2012, where she held roles including Vice President of Corporate Strategy and Business Development, President and CEO of Volvo Technology, and Head of Environmental Affairs at Volvo Logistics. Malin is an elected member of the Royal Swedish Academy of Engineering Sciences and has an MSc in Industrial Engineering and Management from the Chalmers University of Technology in Gothenburg.

**Ian Lee**  
BA, CA, CPA  
Non-Executive Director and Chairman of the Audit Committee

Ian Lee was appointed Non-Executive Director and Chairman of the Audit Committee in 2008. He was a former audit partner of Ernst & Young and a member of their UK Governing Council. Ian was also a non-executive director and chairman of the audit committee of Clyde Process Solutions plc. Ian is currently the independent external member of the audit and risk committee of the Student Loans Company and a director, trustee and chairman of the audit committee of Erskine Hospital. Ian Lee will be stepping down from the Board at the close of the AGM on 8 November 2017.

**Bill Spencer**  
BSc, FCMA, MCT  
Non-Executive Director

Bill was appointed a Non-Executive Director on 24 April 2017. For 15 years until 2010, he was the CFO of Intertek Group plc during a period of international expansion. Since then Bill has had former roles at UK Mail plc and Exova Group plc where he was chairman of their audit committees. Currently Bill is the senior independent director and audit and risk committee chairman of Northgate plc. Bill is a Chartered Management Accountant and Corporate Treasurer and he has a BSc in Management Sciences from the University of Manchester. Bill Spencer will be appointed as Chairman of the Audit Committee at the close of the AGM on 8 November 2017.

# Corporate governance statement



Sir Terry Morgan – Chairman

## CHAIRMAN'S OVERVIEW

I am pleased to introduce the Corporate Governance Statement for the year ended 30 June 2017. Governance is an important contributor to the success of Ricardo and the Board is committed to ensuring that appropriate standards of governance are maintained throughout the Group.

This report sets out the way we comply with good corporate governance principles. It describes how the Board and its committees work, and also our approach to risk management and internal control.

As part of the Board's succession planning, during the year our Nomination Committee conducted a search for an additional Non-Executive Director to succeed Ian Lee when he stands down from the Board at the close of the AGM in November 2017. I am pleased to advise that Bill Spencer joined the Board on 24 April 2017 and it is intended that he will be appointed Chair of the Audit Committee at the close of the AGM in November 2017.

### Sir Terry Morgan, CBE

## UK CORPORATE GOVERNANCE CODE

The Board confirms that the Company has complied with the provisions of the UK Corporate Governance Code published in April 2016 ('the Code') throughout the year ended 30 June 2017.

The 2016 update to the Code was driven by the consequential changes required by the Financial Reporting Council's implementation of the European Union's Audit Regulation and Directive. The FRC also issued updated Guidance on Audit Committees. These took effect for financial years commencing on or after 17 June 2016 and are therefore applicable for the Company's year ended 30 June 2017.

This report describes how the Company has applied the principles and standards set out in the Code during the year and sets out our activities relating to the main sections of the Code:

Leadership, Effectiveness, Accountability, Remuneration and Relations with Shareholders.

The Code and associated guidance are publicly available on the Corporate Governance page of the Financial Reporting Council's website, [www.frc.org.uk/directors/corporate-governance-and-stewardship](http://www.frc.org.uk/directors/corporate-governance-and-stewardship).

## LEADERSHIP

### The Role of Ricardo's Board

Our role is to provide entrepreneurial leadership and we recognise that we are collectively responsible for the long-term success of the Group.

We set strategy and oversee its implementation by the executive team. We assess business opportunities and seek to ensure that appropriate controls are in place to assess and manage risk. We are responsible for reviewing the executive team's performance and we oversee senior-level succession planning within the Group.



## Board meetings and visits

	Board meetings	Committee meetings		
		Audit	Remuneration	Nomination
Number of scheduled meetings in the year	7	3	4	1
Number attended by each member:				
Dave Shemmans	7	-	-	1
Ian Gibson	7	-	-	-
Mark Garrett	7	-	-	-
Sir Terry Morgan, CBE	7	-	4	1
Peter Gilchrist, CB	7	3	4	1
Ian Lee	7	3	4	1
Laurie Bowen	7	3	4	1
Malin Persson	7	3	4	1
Bill Spencer*	2	-	-	-

\*Bill Spencer was appointed on 24 April 2017

We agree the Company's values and standards and ensure that the Company's obligations to its shareholders are met.

We have a formal schedule of matters reserved for our approval which are not delegated to the executive team. These include:

- Strategy;
- Acquisitions and disposals of businesses (over a certain size);
- Annual budgets;
- Capital expenditure (over a certain size);
- Financial results;
- Overseeing systems of internal control, governance and risk management;
- Dividends; and
- Appointment and removal of Directors and the Company Secretary.

The full schedule of matters reserved for our decision is available on our website, [www.ricardo.com](http://www.ricardo.com). We delegate certain responsibilities to our Nomination, Audit and Remuneration Committees. These committees comprise our independent Non-Executive Directors (save for the Nomination Committee, which includes the Chief Executive Officer) and all play a key role in supporting us.

There are seven scheduled Board meetings a year and otherwise as required. Details of attendance at scheduled Board and Committee meetings are shown in the table above. Board meetings focus on driving Ricardo's strategy, developing strong leadership, succession planning, reviewing financial business performance, monitoring risks and protecting the strength of our relationships with clients, employees and other stakeholders. Our agendas allow time for debate and long-term strategic discussion. Our forward planner gives Board members visibility of what is on future agendas for their consideration. The Board agenda is set by the Chairman in consultation with the Chief Executive Officer and the Company Secretary.

We have spent considerable time focusing on the Group's strategies and reviewing progress against respective objectives. We held a strategy meeting in November 2016, at which we reviewed progress and improvements on the five-year strategy agreed in 2014.

## EFFECTIVENESS

## Board composition and independence

As at 30 June 2017, our Board comprised six Non-Executive Directors and three Executive Directors as follows:

Dave Shemmans	Chief Executive Officer
Ian Gibson	Chief Financial Officer
Mark Garrett	Chief Operating Officer
Sir Terry Morgan, CBE	Non-Executive Chairman (independent at time of appointment)
Peter Gilchrist, CB	Independent Non-Executive Director, Senior Independent Director and Chairman of Remuneration Committee
Ian Lee	Independent Non-Executive Director and Chairman of Audit Committee
Laurie Bowen	Independent Non-Executive Director
Malin Persson	Independent Non-Executive Director
Bill Spencer	Independent Non-Executive Director

Biographies of Directors, giving brief details of their experience and other commitments are set out on pages 70 and 71. The wide-ranging experience and backgrounds of the Non-Executive Directors enable them to debate and constructively challenge management in relation to the strategy and performance of the Group.

On 24 April 2017 the Company announced that Ian Lee intended to step down as Non-Executive Director and Chair of the Audit Committee at the close of the AGM on 8 November 2017. On the same date the Company announced that Bill Spencer had been appointed as a Non-Executive Director to the Board. It is intended that Bill will be appointed as Chair of the Audit Committee at the close of the AGM on 8 November 2017.

Bill's early career was in the industrial, manufacturing and technology sectors. For 15 years until 2010, he was the chief financial officer of the FTSE 100 testing, inspection and

certification company, Intertek Group plc, during a period of international expansion. Prior to that he held a number of senior financial appointments with Inchcape plc, Olivetti UK Limited, Rexam plc and Centrica plc. Since 2010, he has developed a varied non-executive career. His former non-executive roles include; UK Mail plc where he was audit committee chairman and Exova Group plc where he was the senior independent director and audit committee chairman. Currently Bill is the senior independent director and audit and risk committee chairman of Northgate plc. Bill has a BSc in Management Sciences from the University of Manchester, is a member of the Association of Corporate Treasurers and has been a member of the Chartered Institute of Management Accountants since 1986.

The Board has concluded that Sir Terry Morgan CBE, Ian Lee, Peter Gilchrist CB, Laurie Bowen, Malin Persson and Bill Spencer are independent in character and judgement. Sir Terry Morgan is also the non-executive chairman of Crossrail Limited, which is a customer of the Group and therefore a related party, as disclosed in Note 37 to the financial statements. As part of the Board's conclusion on independence, this relationship was considered and determined to be immaterial to this assessment. No non-executive member of the Board has ever been an employee of the Company, nor have they participated in any of the Company's share schemes, pension schemes or bonus arrangements. They receive no remuneration from the Company other than the Directors' fees disclosed, and travel expenses. Their fees are determined by the Board as a whole on the recommendation of the Chief Executive Officer. No Director is involved in deciding their own fees. They all held office throughout the year, with the exception of Bill Spencer who joined the Board on 24 April 2017.

The Company has procedures in place to ensure that the Board's power to authorise conflicts of interests are operated effectively and such procedures have been followed during the year.

Letters of appointment for the Non-Executive Directors are available for inspection by shareholders at each Annual General Meeting ('AGM') and during normal business hours at the Company's registered office.

Non-Executive Directors are appointed for specified terms of three years which can be extended by agreement provided that the individual's performance continues to be effective. In accordance with the Company's Articles of Association and the Code, all Directors will retire at the AGM in November 2017 and, being eligible, will offer themselves for election and re-election (as appropriate), save for Ian Lee who will retire from the Board. We believe that each of the Directors should be elected and re-elected by the shareholders because each continues to be effective and demonstrates commitment to the role that each of them performs.

During the year the Chairman met the other Non-Executive Directors without the attendance of the Executive Directors on a number of occasions.

There were several other occasions during the year when informal discussions between various Directors took place.

The Chairman and the Non-Executive Directors have provided assurances to the Board that they remain fully committed to their respective roles and can dedicate the necessary amount of time to attend to the Company's affairs. During the year, Malin Persson

reduced her other non-executive roles and now holds seven appointments. Malin continues to demonstrate her commitment and time to the Company and always makes herself available to the Company, when called upon to do so outside of the Board schedule.

Executive Directors must obtain the prior consent of the Board before accepting a non-executive directorship in any other company. Executive Directors may retain the fees from any such directorship. Two Executive Directors, Dave Shemmans and Mark Garrett, held non-executive directorships during the year under review.

### Board objectives

The Company is confident that the Board and the wider leadership team have the experience and track record to meet the Company's aims of delivering long-term growth and successfully managing the challenges of an expanding international group. The Board sets its specific future objectives at the end of each year and these reflect the particular focus of the Company in the year ahead. Progress against each objective is tracked by the Company Secretary and reviewed with the Chairman and the Board at the mid-year point.

### Chairman, Chief Executive Officer and Senior Independent Director

There is a clear division of responsibilities between the Chairman and the Chief Executive Officer, which is documented, clearly understood and approved by the Board.

Sir Terry Morgan is primarily responsible for leading the Board and ensuring its effectiveness. Dave Shemmans has direct responsibility for the Group on a day-to-day basis and is accountable to the Board for the financial and operational performance of the Group.

Dave Shemmans chairs the Executive Committee, which meets formally at least three times a year. The Executive Committee is primarily responsible for developing and implementing our corporate strategy and policies.

The responsibilities of the Senior Independent Director are also documented and include the provision of an additional channel of communication between our Chairman and the Non-Executive Directors. The Senior Independent Director also provides an additional point of contact for our shareholders should they have concerns that communication through normal channels has failed to resolve their enquiry or where these contacts are inappropriate.

### Board appointments

We recognise our responsibility for planned and progressive refreshing of the Board. There is a formal and transparent procedure for the appointment of new directors, the primary responsibility for which is delegated to the Nomination Committee. Further details of the work undertaken by the Committee during the year under review are contained on page 76. Our Board has continued to discuss matters relating to succession planning and talent management for leadership succession.

### Diversity

Our Board is committed to promoting equality of opportunity for all employees and job applicants, free from all forms of discrimination. Ricardo is an inclusive employer and values diversity of skills, knowledge, background, industry and international experience and



gender in its employees and aims to recruit the best person for the role in all its positions Group-wide.

Our Board appreciates that a diverse range of backgrounds is an important part of succession planning at all levels in the Group. Our Board continually monitors tenure profile and is very conscious of the need to continue to promote diversity at Board level and throughout the Group. Upon engagement of external search consultants our Board requires that full account of all aspects of diversity are considered in preparing candidate lists. Details of the diversity of our workforce are described in the Strategic Report on pages 30 and 31.

## Induction

There is a written framework for the full, formal and tailored induction of new directors. Malin Persson's and Bill Spencer's induction has and will include site visits, meetings with senior management and advisors and the provision of corporate documentation to facilitate their understanding of our business, its operations, key markets and risks.

## Support and professional development

Our Chairman is responsible for ensuring the Directors receive accurate, timely and clear information, with Board and Committee papers being circulated sufficiently in advance of meetings.

The Board and its committees are kept informed of corporate governance and relevant regulatory developments as they arise through the Company Secretary.

In addition, we keep ourselves informed about the Group's activities through a structured programme of presentations from each of the businesses within the Group and from a number of Group functional leaders. During the year under review we received presentations from the Group Human Resources Director and the Group Risk Manager, together with specific presentations on key projects for the business.

Directors are updated continually on the Group's business with monthly performance packs and by means of additional presentations on matters including insurance, treasury, health and safety, and environmental risk management.

The Audit Committee is routinely briefed on accounting and technical matters by senior management and external auditors.

The Remuneration Committee receives updates on remuneration trends and market practices as part of its regularly scheduled business, and during the year under review FIT Remuneration Consultants LLP provided updates on the proposals and reporting requirements for executive remuneration.

Training for directors is available as required and is provided mainly by way of external courses. A register of the training that individual directors have undertaken is maintained by the Company Secretary and is reviewed by the Chairman individually with each Director as part of the Board evaluation process. The Board considers that it is the primary responsibility of each Director to identify the individual training and development needs he or she requires.

All Directors have access to the advice and services of the Company Secretary and each Director has been informed that, in the furtherance of his or her duties, they are entitled to seek

independent professional advice at the Company's expense. The Company arranges appropriate insurance cover in respect of legal actions against its Directors. In addition, the Company has entered into indemnities with its Directors as described on page 106.

## Board evaluation

The Board undertakes a formal review of its performance and that of its Committees each year. Following recommendation by the Nomination Committee during 2016, the Board commissioned an externally-facilitated review, conducted by Condign Consulting Limited, with no other connection to the Company.

The review consisted of attendance at a Board meeting by Duncan Reed of Condign Consulting and one-to-one meetings with each of the Directors and the Company Secretary.

The review and meetings were conducted towards the latter end of the previous financial year and a report was prepared which was discussed in detail by the Board in the July 2016 meeting. Areas for focus and improvement were identified and agreed.

Additionally, Ricardo's auditors and remuneration consultants provide an evaluation on the performance of our Audit and Remuneration Committees, respectively.

Overall, the conclusion from the evaluation and appraisal process was positive, with each Director actively contributing to the effectiveness of the Board and the Committees of which he or she is a member.

## Board committees

Our Board has Nomination, Audit and Remuneration Committees. Written terms of reference for each committee are reviewed annually and are available on our website, [www.ricardo.com](http://www.ricardo.com) or on request from the Company Secretary.

## REMUNERATION Composition

The Remuneration Committee, which is chaired by Peter Gilchrist, comprises the independent Non-Executive Directors, Sir Terry Morgan, Ian Lee, Laurie Bowen, Malin Persson and, since his appointment on 24 April 2017, Bill Spencer.

## Responsibilities

During the year, the Committee had four scheduled meetings. The work of the Committee, including the Chairman's Overview, is described in the Directors' Remuneration Report on pages 82 to 105. The Directors' Remuneration Report is the subject of a binding vote by shareholders at the 2017 AGM.

## ACCOUNTABILITY

This Report provides shareholders with a clear assessment of the Group's and Company's position and prospects, supplemented by other periodic financial and trading statements, as required.

The Board's arrangements for the application of risk management and internal control principles are detailed on pages 38 to 40. The Board has delegated oversight of the relationship with the Group's and Company's external auditors to the Audit Committee. Their work is outlined in the Audit Committee report on pages 77 to 81.

## NOMINATION COMMITTEE



### CHAIRMAN'S OVERVIEW

A key focus during the year has been the appointment of an additional Non-Executive Director. This appointment was managed in conjunction with recruitment consultants, the Inzito Partnership. Further details of this process are included in the Responsibilities section below.

In the forthcoming year we will continue to focus on talent management and succession planning for management below Board level.

### Sir Terry Morgan, CBE

### COMPOSITION

The Nomination Committee, which is chaired by Sir Terry Morgan, comprises the independent Non-Executive Directors, Peter Gilchrist, Ian Lee, Laurie Bowen, Malin Persson and, since his appointment on 24 April 2017, Bill Spencer, together with the Chief Executive Officer, Dave Shemmans. The Committee has one scheduled meeting per year, which is supplemented by ad hoc meetings as necessary and informal meetings between the Committee members.

### RESPONSIBILITIES

The Committee:

- evaluates the balance of skills, knowledge and experience of the Board;
- monitors the leadership needs and succession planning of the Company;
- considers the training needs of the executive and non-executive members;
- regularly reviews the structure, size and composition of the Board; and
- makes recommendations to the Board for executive and non-executive appointments.

Before such recommendations are made, descriptions of the roles and skills required in fulfilling these roles are prepared for particular appointments. To attract suitable candidates, appropriate external advice is taken and interviews conducted

by at least two members of the Nomination Committee to ensure a balanced view.

The search for our new Non-Executive Director during the year was managed with the assistance of recruitment consultants, the Inzito Partnership, who have signed up to the voluntary Code of Conduct for executive search firms. The Inzito Partnership provided a shortlist of candidates who were interviewed by Dave Shemmans and Sir Terry Morgan. Peter Gilchrist, Ian Lee, Laurie Bowen and Malin Persson then interviewed Bill Spencer before it was unanimously agreed to offer Bill the role. Bill will undertake an extensive induction programme to ensure a rounded understanding of the business and our ambitions. The Inzito Partnership have no other connection with the Company.

When an appointment of a non-executive director is made, a formal letter is sent setting out clearly what is expected regarding time commitment, committee membership and involvement outside Board meetings. The chosen candidate is required to disclose to the Board any other significant commitments before the appointment can be ratified.

The Committee recognises the need for diversity, in its broadest sense, when considering the composition of the Board. Diversity in all its aspects, including gender diversity, continues to be important to the Company.

The Board's policy on diversity is set out on pages 74 and 75, and the details of female representation elsewhere within the Group is set out on page 30.

The Chairman of the Committee is the Chairman of the Board, Sir Terry Morgan, except when a new Chairman of the Board is being sought, when it is the Senior Independent Director.

Non-Executive Directors, including the Chairman, are subject to rigorous review when they continue to serve on the Board for any term beyond six years.

### SUCCESSION PLANNING

Name	Date of appointment	Tenure
Dave Shemmans	April 2005	12 years
Ian Gibson	July 2013	4 years
Mark Garrett	July 2008	9 years
Sir Terry Morgan, CBE	January 2014	4 years
Peter Gilchrist, CB	December 2010	7 years
Ian Lee	August 2008	9 years
Laurie Bowen	July 2015	2 years
Malin Persson	January 2016	1 year
Bill Spencer	April 2017	2 months

The Committee has spent time looking at succession planning for the executive director team as well as for the Board over the medium term. We have also discussed talent management and succession planning for the top managers in the business.



## AUDIT COMMITTEE



### CHAIRMAN'S OVERVIEW

The Audit Committee takes an active role in discussing and evaluating risk, as delegated by the Board, to ensure that appropriate challenge and guidance is provided to management and continues to report its key considerations in respect of the significant accounting judgements taken by management during the year.

The Group has now materially completed the integration of the Rail business, together with the Motorcycle business acquired during the financial year, and the Committee has fully incorporated these businesses into its assessment of risk and internal audit. The Group has also acquired Control

### COMPOSITION

The Audit Committee, which is chaired by Ian Lee, comprises the independent Non-Executive Directors, Peter Gilchrist, Laurie Bowen and Malin Persson. Following his appointment on 24 April 2017, Bill Spencer also attended the July and September Committee meetings in anticipation of his planned succession of Ian Lee as Chairman of the Audit Committee with effect from the close of the AGM on 8 November 2017. The competence and experience of the members of the Audit Committee is set out on pages 70 and 71, and is considered to be relevant to the sectors in which Ricardo operates.

The Committee's Chairman, Ian Lee, has recent and relevant financial experience and a professional accountancy qualification as considered desirable by the Financial Reporting Council's Guidance on Audit Committees, issued in April 2016. The Chairman, Executive Directors and the Company's external auditors have standing invitations to attend all Committee meetings. In addition, the Committee meets our external auditors and the Head of Internal Audit without management being present at least once a year. The Committee has three scheduled meetings per year and ad hoc meetings as required. As set out on page 75, the performance of the Audit Committee has been evaluated and is considered to be effective.

Point Corporation subsequent to the year-end and the implications of this acquisition on risk management will be considered by the Committee during the course of the next financial year.

Following the introduction of the viability statement in the previous financial year, the Committee has reviewed the assumptions and results of stress-tested scenarios made by executive management in connection with the provision of an updated viability statement within this 2017 Annual Report and Accounts.

With the heightened risk to all businesses of cyber attacks, the Committee reviewed the effectiveness of general IT controls and the vulnerability of the Group to cyber risks, as well as how these vulnerabilities are being addressed.

I intend to step down as Non-Executive Director and Chairman of the Audit Committee at the close of the AGM on 8 November 2017 and Bill Spencer will succeed me in this role. It has been a pleasure to oversee Ricardo's success over the last nine years and I am confident that the breadth of Bill's experience will be extremely valuable to Ricardo in the years ahead.

**Ian Lee**

### RESPONSIBILITIES

The Committee is established by, and is responsible to the Board. Its main responsibilities are to:

- Monitor and be satisfied with the truth and fairness of the Group's consolidated and Company's standalone financial statements before submission to the Board for approval, ensuring their compliance with the appropriate accounting standards, the law and the Listing Rules of the UK Listing Authority;
- Review the Group's risk profile and the effectiveness of the Group's risk management processes, internal controls and systems;
- Review the effectiveness of the internal audit function and to ensure that it is appropriately resourced;
- Make recommendations to the Board in relation to the appointment and re-appointment of the external auditors and their remuneration, before appointment or re-appointment by the shareholders in general meeting;
- Review the scope and planning of the external audit and be satisfied with the auditors' independence, objectivity and effectiveness on an ongoing basis;
- Review the content of the Annual Report and Accounts and advise the Board on whether, taken as a whole, they are fair, balanced and understandable and provide the information necessary for shareholders to assess the Group's performance, business model and strategy;

- Oversee the annual process that executive management used to enable the Board to confirm the operational and financial viability of the Group for a period of three years from the date of this report;
- Establish and oversee the Group's arrangements for employee disclosure and fraud and bribery prevention arrangements within the Group; and
- Implement the policy relating to any non-audit services performed by the external auditors.

The Chairman of the Audit Committee meets regularly with the Head of Internal Audit and executive management on matters of risk, controls, audit and accounting.

The Audit Committee receives reports from management and internal audit on the effectiveness of the system of internal controls and risk management systems. The Committee also receives from the external auditors a report of matters arising during the course of the audit which the auditors deem to be of significance for the Audit Committee's attention.

The Committee has completed its review of the effectiveness of the Group's systems of internal control during the year and up to the date of the Annual Report, in accordance with the guidance on internal control published by the FRC. The Committee confirms that no significant failings or weaknesses were identified in the review.

The Committee meeting in September 2017 carried out a full review of the year-end consolidated financial statements and of the audit, based upon reports prepared by the Chief Financial Officer and the external auditors, together with taking into account any significant accounting policies, any changes to them and any significant estimates or judgements. A similar, but less detailed, review was carried out in February 2017 when the Interim Report was considered. At both of these meetings, management were challenged as to the existence of any significant or unusual transactions where the accounting treatment could be open to different interpretations.

The Committee also reviewed the processes to assure the integrity of the Annual Report and Accounts, in particular that the information presented in the report, when taken as a whole, is fair, balanced and understandable and contains the information necessary for shareholders to assess the Group's performance, business model and strategy.

The July meetings in both 2017 and 2016 focused on the risk management process, the risk profile, terms of reference, the results of internal audits for the year, the plan for the following year, and the systems for internal control, together with the ethics and whistleblowing processes. At the July 2017 meeting it also reviewed the principles to be applied in respect of significant financial reporting issues and, together with the Board, also reviewed the assumptions used to form the basis of executive management's viability statement, the results of which were reviewed in the September 2017 meeting.

The February 2017 meeting considered the Company's approach to risk appetite and the risk profile of the Group.

The Audit Committee is authorised by the Board to seek and obtain any information it requires from any officer or employee of the Company and to obtain external legal or other independent

professional advice as is deemed necessary by it. The topics covered by the Committee during the year under review included:

- Review of any significant financial reporting issues and judgements in respect of the condensed interim and consolidated year-end financial statements;
- Review of any significant matters raised by the internal auditors;
- Review of risk management processes and impact assessment on the risk profile of the Group as a result of recent acquisitions;
- Discussion and evaluation of risk, as delegated by the Board, to ensure that appropriate challenge and guidance is provided to management;
- Review of the assumptions used to perform the assessment and confirmation made in connection with the viability statement;
- Consideration of the audit fee and the balance between audit and non-audit fees;
- Annual review of the terms of reference of the Committee;
- Evaluation of auditor independence and effectiveness;
- Recommending the re-appointment of the external auditors;
- Review of the effectiveness of internal control systems; and
- Review of the effectiveness of IT general controls and the reduction of vulnerability to cyber risks.

### Significant financial reporting issues considered by the Audit Committee

The Committee receives and considers reports from the Chief Financial Officer and senior management in relation to the critical accounting judgements, key sources of estimation uncertainty, proposed disclosure of these in the 2017 Annual Report and Accounts, and on the outcome of the interim review and annual audit.

The Committee supports PricewaterhouseCoopers LLP in displaying the necessary professional scepticism their role requires. Following discussions with management and the external auditor, the Committee approved the critical accounting judgements and proposed disclosure.

The Committee considered the following significant issues and judgements in approving the 2017 financial statements:

### Contract accounting and performance

The Group derives a significant proportion of its revenue from fixed-price contracts that may extend for a substantial period of time. All contracts are based on detailed proposals issued to clients which are approved in accordance with the Group's authority limits, which may include Board approval where contract values dictate. Revenue and margin performance is measured based on costs incurred to date as a percentage of total expected costs. Management judgement and experience is required to determine the completeness of those forecasts, the recoverability of the costs incurred and the revenue recognised on contracts. Unforeseen future events may adversely impact the accuracy of those forecasts and recoverability judgements.

Project risk is assessed and determined at the proposal stage of a contract and is refreshed throughout the life of a contract on a regular basis. The risk rating of a contract is categorised into five levels, with one being the lowest and five being the highest. The risk category of a contract is determined from the application of quantitative and qualitative criteria. As a contract progresses the project is allocated a 'red', 'amber' or 'green' rating to categorise its performance against a number of factors, including cost and cash performance, schedule,



customer relationship, availability of resources and technical complexity.

High-risk contracts (Category 4 and 5 contracts) which experience significant challenges are categorised internally as 'red' contracts, which are monitored and controlled at the senior management level and reported as appropriate to the Board as part of the monthly performance review. Net Group project over- and under-spends are also monitored and reported to the Board on a monthly basis. A summary of these 'Red Category 4/5' contracts is presented bi-annually by senior management to the Committee at the February and September meetings, where the significant judgements taken are reviewed, challenged and evaluated. Following the September review, the Committee satisfied itself with the judgements taken by management with regards to the Red Category 4/5 contracts. In addition, these contracts were subjected to a more focused level of audit work during the external audit process.

### Capitalisation and carrying value of development costs

Certain directly attributable costs incurred in the development of an intangible asset are capitalised. These costs are recognised as an asset once the Group has determined that it has the intention and the necessary resources to complete the relevant project, and it is probable that the resulting asset will generate economic benefits for the Group and the attributable expenditure can be measured reliably. Determining whether it is probable that the resulting asset will generate economic benefit requires management judgement.

During the year ended 30 June 2017, £3.1m of development costs were capitalised and amortisation of £3.0m was charged. The net book value of development assets as at 30 June 2017 after reclassification adjustments of £0.1m was £8.4m.

The Committee received reports from senior management detailing their analysis and the assumptions used when assessing whether the costs incurred during the year met the requirements for capitalisation under IFRS. The reports also assessed whether future economic benefits support the recoverability of all development assets. The Committee reviewed, challenged and evaluated the significant judgements taken and was satisfied that both the level of capitalisation during the year and the carrying value of the development assets was appropriate. In addition, this matter was a key focus for the external audit.

### Deferred taxation

The Group holds a £9.3m deferred tax asset in relation to accumulated tax losses in Germany and R&D tax credits in the US, as outlined in Note 26(b), 'Deferred tax', to the financial statements. A key management judgement is the extent to which deferred tax should be recognised in respect of these accumulated tax losses and R&D tax credits and recovered against future profits.

The Committee received reports and detailed analysis from senior management which included the assumptions used when assessing the recoverability of the deferred tax asset. This assessment included the derecognition of £1.5m (€1.7m) of the German deferred tax asset, reducing the asset to £2.4m (€2.7m). This was as a result of further contract losses recognised during the year and an extension to the expected period of utilisation against future profits.

The Committee critically evaluated and challenged the appropriateness of management's business plans and expectations

which underpin future taxable profits. The Committee was satisfied that the carrying value of the deferred tax asset was appropriate. In addition, this matter was a key focus of the external audit.

### Internal audit

As set out in the Strategic Report on page 38, internal audit is considered by the Committee to be a key function for effective risk management. Internal audit and risk comprises both the Group risk and internal audit function. Whilst the Group risk function facilitates and manages the risk process that is ultimately owned by the Board, internal audit is accountable to the Audit Committee.

Internal audit is centrally managed and led by suitably skilled staff from head office or parts of the business independent from the business or function being audited. It is resourced by staff from around the Group with suitable skills, experience and independence from the area they are auditing.

Where relevant, external specialists are used to supplement internal resources when specialist knowledge is required. This approach not only ensures independence in the process but also the relevance of the recommendations and the sharing of best practice around the Group.

The following examples illustrate how internal audit work supports Group risk management whilst driving improvements to our control environment and adding value in core business areas:

- Project reviews look at a range of risk and process control areas across projects in divisions: these reviews identify best-practice techniques which can be shared across divisions, and ensure that lessons learned have been applied;
- Selected in-depth process reviews evaluate control risks and efficiency, leading to re-evaluation of risks during the risk review processes; and
- Testing of controls and process awareness in our Fraud and Bribery Risk Assessment.

Management actions from all of our internal audits are tracked to completion and the status of these actions is reported to the Audit Committee to ensure that the risks identified are appropriately addressed.

As part of the annual process the Committee's review of the effectiveness of the internal audit function includes:

- The internal audit process, the audit plan and resources;
- The internal audit reports and management's response to the findings and recommendations; and
- Meetings with the Head of Internal Audit without management being present; additionally, the Head of Internal Audit is invited to attend audit committee meetings where considered appropriate.

The Audit Committee considers that the internal audit process is an effective tool in the overall context of the Group's risk management system.

### Whistleblowing, ethics and fraud prevention

Internal audit scope includes a review of compliance with Group policies, including established whistleblowing, ethics, Bribery Act and fraud prevention policies.

The whistleblowing policy is designed to deal with concerns, which must be raised without malice, in relation to specific issues which are in the public interest and which fall outside the scope of other Company policies and procedures. The whistleblowing policy is overseen by the Chairman of the Audit Committee, and has been reviewed during the year and is promoted via the staff briefing process and the Company's intranet site. No such matters were reported to the Committee during the year.

### External audit

One of the Committee's duties under its Terms of Reference is to ensure that at least once every ten years, commencing 1 July 2013, the audit services contract is put out to tender to enable the Committee to compare the quality and effectiveness of the services provided by the incumbent auditor with those of other audit firms. PricewaterhouseCoopers LLP were appointed as external auditors in 1990 and no formal tender for audit services has been conducted to date since their appointment.

Subject to shareholder approval at the AGM in November 2017, it is expected that the audit services contract will remain with PricewaterhouseCoopers LLP for the financial year ending 30 June 2018. In addition, and subject to Board and shareholder approval, it is expected that the audit services contract will be put out to tender during the next financial year and that the appointment of the selected audit firm will commence after the AGM in November 2018. This would coincide with the conclusion of the five-year rotation cycle of the incumbent audit partner from PricewaterhouseCoopers LLP, Andrew Paynter, who has been the audit partner for four years.

The external auditors are required to give the Committee information about policies and processes for maintaining their independence and compliance with requirements regarding the rotation of audit partners and staff.

Both the Board and the external auditors have for many years had safeguards in place to avoid the possibility that the auditors' objectivity and independence could be compromised.

The Committee considers all relationships between the external auditors and the Group to ensure that they do not compromise the auditors' judgement or independence, particularly with the provision of audit-related and other non-audit services where a policy relating to these has been agreed by the Board.

The external auditors would be precluded from carrying out non-audit services if they are put in the position of auditing their own work, making management decisions for the Group, if a mutual interest between the Group and the auditors is created, or if the auditors take on the role of an advocate for the Group. The provision of certain non-audit services is also specifically prohibited. Our policy in respect of non-audit services provided by the external auditors is as follows:

#### Audit-related services

The external auditors are invited to provide services which, in their position as auditors, they must or are best placed to undertake. This includes review of the interim results and any other review of the financial statements for regulatory purposes; assurance work related to accounting standards, compliance and corporate governance, including high-level controls; work in connection

with listing particulars and prospectuses, if required; and regulatory reviews or reviews commissioned by the Audit Committee.

Approval of audit-related services which are routinely provided by the auditor, such as the review of the interim results, are delegated to the Audit Committee Chairman and the CFO. Prior approval by the Audit Committee Chairman is required for other audit-related services where the cost is estimated to exceed £50,000. Such services are pre-approved if estimated to cost less than £50,000 on the basis that the cost and nature of those services is considered to be clearly trivial.

#### Other non-audit services

There may be occasions when the external auditors are best placed to provide other accounting, advisory, consultancy and due diligence work on behalf of the Group due to their in-depth knowledge of the business. However, the following services are specifically prohibited:

- Tax services relating to the preparation or calculation of any form of tax, supporting tax inspections (unless required by law) or the provision of tax advice;
- Bookkeeping and preparing accounting records and financial statements;
- Payroll and human resources services, including organisational structure design and cost control;
- Secondments to management positions that involve any decision-making;
- Services relating to the internal audit function, or design and implementation of internal control or risk management procedures;
- Valuations, including actuarial or litigation support services;
- Legal services, including the provision of general counsel, negotiating or acting in an advocacy role in the resolution of litigation;
- Services linked to financing, capital structure and allocation, and investment strategy;
- Promoting, dealing in, or underwriting shares; and
- Any other work which is prohibited by UK ethical guidance.

Prior approval by the Audit Committee Chairman is required for non-audit services provided by the external auditors in respect of acquisitions and disposals where the cost is estimated to exceed £50,000. Prior approval by the Committee as a whole is required for any other permissible non-audit services provided by the external auditors in excess of £50,000. Such services are pre-approved if estimated to cost less than £50,000 on the basis that the cost and nature of those services is considered to be clearly trivial.

From 30 June 2020, non-audit services are prohibited from exceeding more than 70 per cent of the average audit fees for the preceding three-year period. The split and ratio between audit and non-audit fees for the year ended 30 June 2017 and information on the nature of non-audit fees are disclosed in Note 6, 'Auditors' remuneration', to the financial statements.

#### Other business relationships

There are instances where the Energy & Environment business enters into business relationships or joint arrangements with the external auditors to pursue commercial opportunities, either as a



prime contractor, sub-contractor or as part of a consortium, with either party or a third party being the project manager.

These business relationships are considered acceptable to the extent that the resulting relationships remain immaterial to both organisations and do not compromise the auditors' independence. In addition, the following arrangements would lead to a conclusion that the relationship with the auditor is material, and hence they are not permitted:

- Co-branding, profit-sharing or other joint sharing of economic benefit; or
- Any member of the audit firm's audit engagement team having client-facing involvement.

The following policy applies:

- The maximum allowable annual revenue derived from non-audit client-facing relationships between Ricardo and the external auditors is £1,000,000. In the event that this might be exceeded, the CFO, Audit Committee Chairman and audit engagement partner shall recommend action to the Audit Committee;
- The audit firm's engagement partner must be involved prior to the agreement to bid, through the CFO, Group Financial Controller or Group Risk Manager;
- Prospective contracts in excess of £100,000 must be approved by the CFO and the Audit Committee Chairman before the bid is released; and
- Prospective contracts lower than £100,000 must be approved by the CFO, Group Financial Controller or Group Risk Manager.

All bids must be structured to ensure that no commonality of interest exists, or could be perceived to exist, between the two parties.

The Audit Committee confirms that during the year it has maintained formal and transparent arrangements for considering corporate reporting, risk management and internal control and for maintaining an appropriate relationship with the external auditors.

### Independent auditors' effectiveness

The independent auditors' quality and effectiveness is assessed on its own merits on an annual basis after the completion of each audit. The Committee carried out a formal effectiveness assessment of the external auditors, including:

- The continuity and objectivity of the audit partner and audit team;
- Effectiveness of audit planning, execution and reporting;
- The role of management in ensuring an effective audit; and
- Communication with and support of the Audit Committee.

The assessment was completed with input from an internal questionnaire completed by senior and relevant finance staff. The Committee also considered the external auditors' annual transparency report on its own internal quality control procedures.

### Re-appointment of independent auditors

The Audit Committee has recommended to the Board that the re-appointment of PricewaterhouseCoopers LLP be proposed to shareholders at the 2017 Annual General Meeting.

## RELATIONS WITH SHAREHOLDERS

### Shareholder dialogue

The Chief Executive Officer and the Chief Financial Officer regularly meet with institutional shareholders to foster a mutual understanding of objectives, answer their questions and to keep them updated on our performance and plans.

These meetings range from one-to-one discussions to group presentations and investor conference calls following our results announcements. Any presentations provided in these meetings are uploaded to our website and comments are fed back to us.

Additionally, the Chairman communicates with key shareholders at least once a year and the Chairman, the Senior Independent Director and the Chairman of the Audit Committee are available for discussions with major shareholders, if required. The Chairman also looks to shareholder groups' annual voting guidelines to better understand their policies on governance and voting.

The Chair of the Remuneration Committee engaged with majority shareholders in May 2017 to discuss and gain input to the Company's revised Directors' Remuneration Policy. Further details are provided in the Directors' Remuneration Report on pages 86 to 94.

For an independent view, Investec, the capital markets advisory firm, provides us with regular reviews of major investors' views on company management and performance. Surveys of shareholder opinion are normally carried out following announcements of results and are circulated to the Board.

### Ricardo's AGM

The Notice of Meeting sets out the resolutions being proposed at the AGM on 8 November 2017 at 10:00am. Last year all resolutions were passed with votes ranging from 99% to 100%. Shareholders unable to attend the AGM are encouraged to vote in advance of the meeting.

The AGM in November 2016 was attended by all Directors in office at the time of the meeting. The Directors encourage the participation of all shareholders, including private investors, at the AGM and as a matter of policy the level of proxy votes (for, against and vote withheld) lodged on each resolution is declared at the meeting and displayed on the Company's website.

Ricardo's website, [www.ricardo.com](http://www.ricardo.com), contains a wealth of information, including:

- Latest Ricardo news, stock exchange announcements and press releases; and
- Annual report and investor presentations.

The Corporate Governance Statement was approved by the Board of Directors on 13 September 2017 and signed on its behalf by:



**Sir Terry Morgan, CBE**  
Chairman



**Ian Lee**  
Chairman of the Audit Committee

# Directors' remuneration report



Peter Gilchrist – Chairman of the Remuneration Committee

## PART 1 – CHAIRMAN'S SUMMARY

Dear Shareholder,

### Chairman's overview

Ricardo's 2017 Annual Report shows that the Company has continued to pursue and execute its long-standing strategy amidst an operating environment of change and uncertainty. We have continued to manage the Group for growth by maintaining investment both in acquisitions and organic growth. The most recent acquisitions expand both the motorcycle division with Exnovo, and Ricardo Defense Systems in the US with Control Point Corporation (the latter of which completed post year-end). Ricardo's underlying profit before tax ('PBT') was 2% up on the previous year (before adjustments for acquisition-related expenditure) and our net debt was £(37.9)m compared with £(34.4)m last year. Although our Rail and Energy & Environment Divisions performed strongly,

the performance of our Automotive Division has been volatile. The combined effects of Brexit, the US elections and the intense diesel debate have created uncertainty and extremely challenging conditions. The consequence is that, despite a credible performance in parts of the business, no annual bonuses will be paid to the Executive Directors for the financial year even though they have made sound, long-term decisions and performed very well against their personal objectives. The Annual Report on Remuneration says more on page 99.

We remain confident, however, that the strategic priorities are right. These priorities have endured for several years under the leadership of Dave Shemmans, Ricardo's CEO, and have delivered significant value to our shareholders. Over the last five financial years, Ricardo's total shareholder return ('TSR') has grown by 155.3% and by 29% over the last three. The TSR chart on page 97 shows Ricardo's TSR performance over the last eight years.



## Pay outcomes and the review of our policy in 2016/2017

Our superior performance over the three years following Ricardo's long-term share awards made in October 2014 has resulted in a second year in which all the shares under award have vested. EPS growth over the period was 56% and, in real terms, 14.6% a year. The Remuneration Committee's policy seeks to ensure a direct link between pay and performance; the pay outcomes during the year in respect of the long-term incentive arrangements and the annual bonus demonstrate the implementation of this policy.

The Remuneration Committee has taken time during the year to review the Directors' Remuneration Policy ('the Policy') and we have also engaged with our top 20 shareholders and the voting guidance services on the proposed new Policy. At the Annual General Meeting in November, shareholders will be asked to approve this new Policy. Our strategic aims remain the same as they were in 2014 and hence the new Policy will remain substantially the same although we are proposing some modifications in light of shareholders' views. The modifications that we are proposing to the Policy are, in brief, as follows:

- The extension of clawback provisions to the annual cash bonus and the shares awarded which are linked to the cash bonus.
- The tightening up of Ricardo's share ownership policy which makes the ownership guideline of 100% a minimum. Our longest-serving Executive Directors, namely Dave Shemmans and Mark Garrett, already hold shares to the value of 168% and 340% of salary, respectively. Our policy approach takes into account (i) the

requirement that 100% of the net value of vested long-term incentive shares must be retained until Executive Directors have reached the minimum holding required as well as (ii) the face value of awards under those arrangements (further described on page 101).

- Limits will be imposed on all elements of pay.

As the summary of our Policy shows on page 85, we are retaining the so-called deferred bonus matching shares. The Remuneration Committee has looked at whether these shares should be eliminated in favour of shares awarded under the Long-Term Incentive Plan. We have decided that to do so would forfeit the double performance test which applies to the deferred bonus matching shares. Under the current and proposed Policy, the Executive Directors must first earn a bonus and then defer half of it before the 'matching' shares are awarded.

Some of our shareholders have suggested that we should simplify Ricardo's long-term incentive arrangements and have also questioned why the same performance measures and targets apply to all the shares. We have, in response, simplified the language that we use to describe the shares to make clearer that the Remuneration Committee views Ricardo's long-term share-based incentive arrangements as comprising a single share award which will normally vest three years after grant. Part of the award (now called the Bonus-Linked Shares) is dependent on a bonus being earned, investment by the Executive Director and that investment being retained for three years. This means that it will only be made if a bonus is earned. The extension

Long-term incentive awards	Role	LTIP shares	Bonus-Linked (LTIP) shares	Total award
	CEO	100%	-	100%
	CFO	55%	-	55%
	COO	55%	-	55%

and alignment of Ricardo's clawback provisions, so that they can be applied in the same way to all share-based pay, reinforces our policy objective here.

The figures above illustrate that we think the current approach creates a stronger link between pay and performance, which is particularly apparent in a year in which no bonus is paid.

We are not proposing to introduce longer performance or vesting periods in excess of three years, although the extension of clawback provisions to all variable pay will allow us to reclaim remuneration for three years after payment or two years after vesting. We think three-year performance periods remain appropriate for a company like Ricardo where business cycles tend to be short.

### Other activities in 2016/17

It might be helpful to know that we increased the basic salaries of the executive directors from 1 January 2017 by 3%, which was the average increase across the Group. We also looked carefully at the approach to measuring growth in Earnings Per Share ('EPS') for the purposes of the long-term incentive arrangements. Annual compound EPS growth has for several years been measured against Retail Price Index ('RPI') inflation and the target range has been compound annual growth of 3% to 10% in excess of RPI. The vesting outcomes, as a percentage of the maximum award, have ranged from 35% to 100% over the last seven years and averaged 66%. We

intend to maintain an approach to target setting which we believe is both fair to shareholders and to the leadership team.

We have decided to change the approach for the awards which will be made in November 2017 to enhance 'line of sight', simplify and also to recognise the international scope of Ricardo. As we explain on page 105, we have decided to set absolute EPS targets and to express the desired range of EPS outcomes. The target range will still be set based on the business plan (which, in turn, is based on our long-term strategy) and consensus forecasts.

### Conclusion

I hope that our shareholders will find the 2016/17 Directors' Remuneration Report clear and helpful. Our last Directors' Remuneration Policy and the Annual Report on Remuneration both received over 98% of votes in favour and I continue to be grateful for this support. If you have any questions, feel free to contact me through Ricardo's Group Legal Counsel and Company Secretary, Patricia Ryan, at [patricia.ryan@ricardo.com](mailto:patricia.ryan@ricardo.com)

### Peter Gilchrist

Chairman of the Remuneration Committee



## SUMMARY OF THE KEY ELEMENTS OF EXECUTIVE DIRECTORS' PAY

	Dave Shemmans CEO	Ian Gibson CFO	Mark Garrett COO	What is changing
<b>Base salary</b>	£480,800 (effective 01/01/2017)	£309,515 (effective 01/01/2017)	£270,122 (effective 01/01/2017)	<b>New Policy will introduce a maximum</b>
<b>Other benefits</b>	<ul style="list-style-type: none"> <li>Company car allowance: £17,500</li> <li>Private fuel</li> <li>Private medical insurance</li> <li>Life assurance</li> </ul>	<ul style="list-style-type: none"> <li>Company car allowance: £12,000</li> <li>Private fuel</li> <li>Private medical insurance</li> <li>Life assurance</li> </ul>	<ul style="list-style-type: none"> <li>Company car allowance: £12,000</li> <li>Private fuel</li> <li>Private medical insurance</li> <li>Life assurance</li> </ul>	<b>Policy maximum will be set as far as possible</b>
<b>Pension</b>	21.2% <sup>(1)</sup> of salary (over Lower Earnings Limit)	20% of salary (over Lower Earnings Limit)	20% of salary (over Lower Earnings Limit)	<b>No change but policy for future executive directors is under review</b>
<b>Annual bonus with deferral of half of any bonus earned</b>	<ul style="list-style-type: none"> <li>Maximum opportunity of 125% of salary</li> <li>Based on PBT (60%), cash (15%) and personal targets (25%)</li> <li>50% of any bonus to be deferred into shares for three years</li> </ul>	<ul style="list-style-type: none"> <li>Maximum opportunity of 100% of salary</li> <li>Based on PBT (60%), cash (20%) and personal targets (20%)</li> <li>50% of any bonus to be deferred into shares for three years</li> </ul>	<ul style="list-style-type: none"> <li>Maximum opportunity of 100% of salary</li> <li>Based on PBT (60%), cash (20%) and personal targets (20%)</li> <li>50% of any bonus to be deferred into shares for three years</li> </ul>	<b>No change except that clawback provisions will now apply to all variable pay</b>
<b>Long-term incentive shares</b>				
(1) Deferred bonus matching shares (to be the Bonus-Linked Shares)	<ul style="list-style-type: none"> <li>An award of shares with a value on grant of half the gross equivalent of any annual bonus declared</li> <li>Vests approximately four years from the start of the bonus performance period if executive still in service and additional performance criteria are met over a three-year period: 50% EPS growth, 50% TSR vs FTSE Small Cap Index</li> <li>Net value of all vested shares to be retained until share ownership requirement met</li> </ul>			<b>No change except to nomenclature and application of clawback for two years after vesting</b>
	Maximum award on grant: 62.5% of salary	Maximum award on grant: 50% of salary	Maximum award on grant: 50% of salary	<b>No change</b>
(2) Long-term incentive plan	<ul style="list-style-type: none"> <li>Annual award of shares with face value of 100% of base salary for the CEO and 55% for the CFO and COO</li> <li>Subject to three-year performance conditions: 50% EPS growth, 50% TSR vs FTSE Small Cap Index</li> <li>Net value of vested shares to be retained until share ownership requirement met</li> </ul>			<b>No change. EPS performance range is reviewed annually</b>
<b>Total maximum annual award of shares (1 + 2)</b>	<b>162.5% of salary</b>	<b>105% of salary</b>	<b>105% of salary</b>	<b>No change</b>
<b>Share ownership and retention policy</b>	<ul style="list-style-type: none"> <li>A minimum of 100% of base salary</li> <li>Net value of all vested shares to be retained until holding met</li> <li>Year-end holding is 168% of salary</li> </ul>	<ul style="list-style-type: none"> <li>A minimum of 100% of base salary</li> <li>Net value of all vested shares to be retained until holding met</li> <li>Year-end holding: 35% of salary</li> </ul>	<ul style="list-style-type: none"> <li>A minimum of 100% of base salary.</li> <li>Net value of all vested shares to be retained until holding met</li> <li>Year-end holding is 340% of base salary</li> </ul>	<b>No change</b>

(1) This reflects legacy pension arrangements.

## PART 2 – DIRECTORS' REMUNERATION POLICY

### Introduction

This Directors' Remuneration Policy provides an overview of the Company's policy on directors' pay that is designed to align with and support Ricardo's strategic plan and operate over the next three years from the AGM to be held on 8 November 2017 (the '2017 AGM') until the AGM to be held in 2020. The previous policy that was approved by shareholders at the AGM held on 29 October 2014 will continue to operate until the 2017 AGM and indeed the new policy will permit the execution of remuneration arrangements that were agreed when the previous policy was in effect.

In accordance with the requirements of the Large and Medium-sized Companies and Groups (Accounts and Reports) Regulations 2008 (as amended) (the 'Regulations'), the policy contained in this part will be subject to a binding vote at the 2017 AGM and will take effect immediately upon receipt of such approval from shareholders.

As discussed in the Chairman's introductory letter, following a thorough and careful review of the structure of the 2014 policy, its operation in our business and the views of our largest shareholders, their industry bodies and other corporate governance commentators, the Remuneration Committee

is satisfied that this policy continues to support Ricardo. The policy motivates the executive team and supports the essential alignment between the Group's strategy and shareholders' interests. Consequently, the new policy to be proposed at the 2017 AGM remains the same as the 2014 policy, save that it:

1. Introduces – as far as possible – ceilings on the elements of our policy which are not yet capped, namely base salary and benefits.
2. Aligns and extends the clawback provisions which already apply to shares awarded under the Long-Term Incentive Plan ('LTIP') to the annual cash bonus and deferred bonus shares (i.e. both the shares invested by each individual and the accompanying contingent award of performance shares). This change does two things. It ensures that malus and clawback provisions apply to all Ricardo's variable pay. It also underscores the view held by the Remuneration Committee that the deferred bonus matching shares (now called the Bonus-Linked Shares) are effectively LTIP shares but with an additional pre-grant performance linkage which determines (a) whether an award is made in the year and (b) the size of that award.
3. Has been simplified in terms of presentation.

### The Remuneration Committee – what we do

The Committee's primary purpose is to make recommendations to the Board on the Group's framework or broad policy for executive remuneration. The Board has also delegated responsibility to the Committee for determining the remuneration, benefits and contractual arrangements of the Chairman and the executive directors. No individual is involved in deciding his or her remuneration.

The Committee has written terms of reference, which are available at [www.ricardo.com](http://www.ricardo.com), and its responsibilities include:

- determining and agreeing with the Board the policy for executive remuneration and monitoring and considering the policy for and structure of senior management remuneration taking into account that the ultimate decision-making responsibility for the remuneration of the senior management team (other than the executive directors) lies with the Chief Executive Officer;
- agreeing the terms and conditions of employment for executive directors, including their individual annual remuneration and pension arrangements, and reviewing such provisions for senior management;
- agreeing the measures and targets for any performance-related bonus and share schemes;
- agreeing the remuneration of the Chairman of the Board;
- ensuring that, on termination, contractual terms and payments made are fair both to the Company and the individual so that failure is not rewarded and the duty to mitigate loss is recognised wherever possible; and
- agreeing the terms of reference of any remuneration advisors it appoints.

### Taking shareholders' views into account

When considering Ricardo's remuneration policy and its implementation, the Committee is always keen to ensure that it takes into account the views and opinions of all the relevant stakeholders in the business. In particular, when preparing its policy for approval at the 2017 AGM, the Committee undertook a programme of engagement with the Company's largest institutional investors and their representative bodies in order to better understand their perspective on our existing pay practices and the proposed new policy for 2017-2020. Shareholders were given an early opportunity to raise any questions and in finalising the proposals a number of questions were raised and answered: for example, on the use of the same performance measures in respect of the deferred bonus matching shares and the change in nomenclature to the Bonus-Linked Shares. Both are designed to simplify Ricardo's long-term incentive arrangements.

In the spirit of continuous improvement and in order to ensure that our remuneration policy continues fully to support achievement of business objectives and delivery of value to shareholders, the Committee will continue to review our policy periodically in the context of the changing business environment. Any material future changes to policy will be discussed with shareholders in advance.

### Consideration of employment conditions elsewhere in the Company

While Ricardo does not consult directly with employees on the subject of directors' remuneration, the remuneration packages for each executive director and their fixed and variable elements are reviewed annually. This process takes into account a number of factors, including the following:

- Individual and business performance;
- Pay arrangements for similar roles in other companies and consultancy organisations of Ricardo's size, complexity and international reach;
- Risk management; and
- Pay and employment conditions of employees of the Group.

The Remuneration Committee also looks at the differential between the CEO's pay and Ricardo's average employee earnings over time.



## Overview of Ricardo's proposed remuneration policy for 2017-2020

The objective of Ricardo's executive remuneration policy is to support the business strategy and timescales of an international consultancy business by not only rewarding the standard of performance and the outcomes that our shareholders require, but also encouraging share ownership and fostering alignment of interest between the executive directors and shareholders. We do this by setting base levels of salary that are competitive, compared with companies of similar size and complexity to Ricardo, and providing other remuneration package elements, namely the short-term annual bonus plan and long-term incentive arrangement, that only pay for performance. Taken together, our two variable pay platforms focus on growing the profitability of the business, its resilience, the achievement of discrete non-financial targets and linking executive outcomes with the shareholder experience both by delivering rewards in the form of Ricardo shares and also by using a relative total shareholder return performance measure over the longer term.

The remuneration policy proposed for shareholder approval at the 2017 AGM is:

- simple and straightforward;
- well-understood, both internally and externally;
- competitive but fair; and
- aligned to performance.

## THE STRUCTURE OF OUR DIRECTORS' REMUNERATION PACKAGE – THE POLICY TABLE

Pay element and link to strategy	Maximum	Operation	Framework for assessing performance
<b>Base salary</b> <i>To provide a core level of remuneration to enable the Company to attract and retain skilled, high-calibre executives to deliver its strategy</i>	Base salary increases will not ordinarily be more than 10% p.a. with exceptional increases over the normal maximum limit capped at 25% p.a.  However, generally speaking, increases will be in line with salary increases for employees across the Group.	Salary levels are reviewed annually in January each year.  Pay is set by considering market levels of total pay for comparable roles in companies of similar size, complexity and sector, as well as each individual director's experience, scope of responsibilities and performance and the salary increases for employees across the Group.  Ricardo places a strong emphasis on internal succession planning. This emphasis may mean that talented individuals are promoted rapidly. In such circumstances, the Committee's policy is to set a relatively low base salary initially and then increase this to a market competitive level for the role over time. This may mean relatively high annual salary increases as the individual gains experience in the new role. We will notify shareholders where this is the case.	None
<b>Other benefits</b> <i>To provide market-competitive benefits</i>	The total value of benefits will not exceed 10% of base salary p.a., save in the case of relocation.	The Company provides other cash benefits and benefits in kind to executive directors in line with market practice. These include a company car or cash alternative, private fuel, private medical insurance, life assurance and permanent health / disability insurance. The benefits arrangements are reviewed on an annual basis.  The Committee reserves the right to provide further benefits where this is appropriate in the individual's particular circumstances (for example costs associated with relocation as a result of the director's role with the Company).  Certain other employees are eligible for the same or similar benefits described above depending on their role, seniority and geographical location.	None

Pay element and link to strategy	Maximum	Operation	Framework for assessing performance
<p><b>Pension</b> <i>To offer market-competitive retirement benefits</i></p>	<p>For the Chief Executive Officer, the pension contribution is 21.2% of salary over the Lower Earnings Limit due to legacy pension arrangements.</p> <p>For all other executive directors, the pension contribution is 20% of salary over the Lower Earnings Limit.</p>	<p>The Company operates a Defined Contribution Scheme, the Ricardo International Pension Scheme ('RIPS'). The policy for executive directors (save for the CEO's legacy pension arrangements described opposite) continues to be a pension contribution of 20% of base salary only over the Lower Earnings Limit. Contributions are made up to the adjusted annual allowance limit and the rest paid as cash in lieu of pension.</p> <p>Executive directors may only choose to opt out of the RIPS where they are close to or have exceeded the pension lifetime allowance and have applied for fixed protection from HMRC. Under such circumstances, executive directors will receive a cash payment in lieu of pension.</p> <p>On death in service, all executive directors, subject to the medical requirements of the insurance company, are entitled to a lump sum of four times annual salary at date of death.</p> <p>Early retirement is available with the consent of the Company and the pension scheme trustees if the individual is over 55 or retiring due to ill health.</p> <p>The same policy approach applies to all employees although contribution levels vary by seniority.</p>	<p>None</p>



Pay element and link to strategy	Maximum	Operation	Framework for assessing performance
<p><b>Pay for performance:</b> <b>Annual bonus</b></p> <p><i>To reward the annual delivery of financial and operational targets</i></p>	<p>Maximum opportunity of 125% of base salary for the CEO and 100% of salary for other executive directors.</p>	<p><b>Bonuses are awarded by reference to performance against specific targets measured over a single financial year.</b></p> <p>One half of any bonus paid to an executive director will be paid out shortly after the assessment of the performance targets has been completed. The remainder of the bonus will be compulsorily deferred into ordinary shares, the vesting of which is normally subject to continued employment for a three-year period from the award date. The cash element of the bonus is not payable unless the individual remains in employment at the payment date.</p> <p>The principal purpose of this bonus deferral mechanism is to:</p> <ul style="list-style-type: none"> <li>• provide for further alignment of executives' and shareholders' interests;</li> <li>• provide an additional retention element; and</li> <li>• encourage executive directors to build up a shareholding in accordance with our share retention policy.</li> </ul> <p>Dividends and dividend equivalents for each deferral period may also be paid in respect of shares under award to the extent that shares have vested in participants.</p> <p>Bonus arrangements exist for certain other employees throughout the Group on terms that are applicable to their role, seniority and geographical location, although typically at lower levels of maximum opportunity to reflect that a greater proportion of executive directors' remuneration is performance based.</p> <p><b>Malus / clawback:</b> Annual bonuses (including any element deferred into shares) may be subject to malus and/or clawback provisions if certain events occur in the period of three years from the end of the financial year to which they relate. These events include the Committee becoming aware of:</p> <ul style="list-style-type: none"> <li>• a material misstatement of the Company's financial results;</li> <li>• an error in the calculation of performance conditions; and/or</li> <li>• an act committed by the relevant participant that could have resulted in summary dismissal by reason of gross misconduct or which has caused significant reputational damage to the Group.</li> </ul> <p>The mechanism through which malus / clawback can be implemented enables the Committee to take various actions including:</p> <ul style="list-style-type: none"> <li>• reducing outstanding incentive awards; and</li> <li>• requiring a cash payment to be made by participants.</li> </ul>	<p>The measures and targets applicable to the annual bonus scheme (and the different weightings ascribed to them) are set annually by the Committee in order to ensure they are relevant to participants and take account of the most up-to-date business plan and strategy.</p> <p>A significant majority (at least 50%) of the bonus opportunity will normally be determined by reference to performance against Group KPIs such as:</p> <ul style="list-style-type: none"> <li>• PBT; and</li> <li>• cash balance.</li> </ul> <p>Any remaining part of a director's bonus will normally be based on the achievement of personal objectives which relate to delivery of the business strategy. Examples include the development and efficient execution of the strategic plan, developing the business in emerging markets, identifying opportunities for inorganic growth and succession planning.</p> <p>A payment scale for different levels of achievement against each performance target is specified by the Committee at the outset of each year – this ranges from 0% for below-threshold performance up to 100% for full satisfaction of the relevant target.</p>

Pay element and link to strategy	Maximum	Operation	Framework for assessing performance
<p><b>Pay for performance: Long-term incentives</b></p> <p>Bonus-Linked Shares</p> <p><i>To link short-term and long-term performance</i></p> <p>Performance shares under the long-term incentive plan ('LTIP') and Bonus-Linked Shares</p> <p><i>To focus motivation on the long-term performance of the Group and reward shareholder value creation</i></p> <p><i>To encourage share ownership and alignment with shareholders</i></p>	<p>Maximum opportunity in aggregate of 162.5% of salary for the CEO and 105% of salary for other executive directors</p>	<p><b>Bonus-Linked Shares – performance measured over an aggregate four-year period:</b></p> <p>Assuming that a satisfactory level of performance is achieved over the financial year in which the annual bonus is assessed (the first year in the four-year aggregate performance period) which results in a bonus being paid, executive directors will be granted a Bonus-Linked Share award over further shares (up to a maximum of 1 for 1) in relation to the deferred element of the bonus. Consequently, in a year when there is no annual bonus, no Bonus-Linked Share award will be made thus providing a well-understood and automatic mechanism for reducing the overall quantum of awards in the year where performance targets have not been met in full.</p> <p>Bonus-Linked Share awards will be granted pursuant to the rules of the Ricardo plc 2011 Deferred Bonus Plan (the '2011 DBP'), for which shareholder approval was given at the 2011 Annual General Meeting.</p> <p><b>LTIP – performance measured over a three-year period:</b></p> <p>Performance share awards under the LTIP are made on an annual basis to the executive directors and a small group of other senior executives.</p> <p><b>Dividends and equivalents</b></p> <p>Dividends and dividend equivalents for each performance period may also be paid in respect of shares under award to the extent that shares have vested in participants.</p> <p><b>Malus / clawback:</b> Long-term incentive awards may be subject to malus and/or clawback provisions if certain events occur after their grant but before the expiry of the period of two years from the end of the relevant performance period. These events include the Committee becoming aware of:</p> <ul style="list-style-type: none"> <li>• a material misstatement of the Company's financial results;</li> <li>• an error in the calculation of performance conditions; and/or</li> <li>• an act committed by the relevant participant that could have resulted in summary dismissal by reason of gross misconduct or which has caused significant reputational damage to the Group.</li> </ul> <p>The mechanism through which malus / clawback can be implemented enables the Committee to take various actions including:</p> <ul style="list-style-type: none"> <li>• reducing outstanding incentive awards; and</li> <li>• requiring a cash payment to be made by participants.</li> </ul> <p>Finally, where the vesting of a deferred bonus share award is reduced, the vesting of any associated Bonus-Linked Share award will accordingly be reduced.</p>	<p>In addition to the initial performance period to determine whether Bonus-Linked Share awards are made, the vesting of all long-term incentives is subject to both continued employment and the extent to which performance conditions measured over a further specified three-year period are met.</p> <p>The measures and targets applicable to the long-term incentive awards will consist of challenging shareholder return, financial and/or strategic measures.</p> <p>The particular measures and targets to apply (and the different weightings ascribed to them) will be set annually by the Committee in order to ensure they are relevant to participants, challenging to achieve and take account of the most up-to-date business plan and strategy. The current weightings between the two long-term incentive measures that we use are equal; however our policy is simply for financial and/or shareholder return targets to make up at least 50% of awards.</p> <p>25% of each element of an award will vest for achieving the threshold performance target with 100% of the awards being earned for maximum performance (with straight-line vesting between these points).</p> <p>Further details of the performance conditions applicable to awards to be made in 2017 are set out on page 105.</p>



Pay element and link to strategy	Maximum	Operation	Framework for assessing performance
<b>Chairman and other non-executive directors</b> <i>Helps recruit and retain high-quality experienced individuals.</i> <i>Reflects time commitment and role.</i>	Company's Articles of Association place a limit on the aggregate annual level of non-executive directors' and Chairman's fees (currently £500,000)	<p>The fees for non-executive directors are set in line with prevailing market conditions and at a level that will attract individuals with the necessary experience and ability to make a significant contribution to the Group's affairs.</p> <p>Non-executive directors receive an annual basic fee plus an additional fee for acting as the Chairman of the Audit or Remuneration Committee or the Senior Independent Director. An additional fee may be paid for membership of the Technical Exploitation Board ('TEB'). No non-executive director is currently a member of the TEB. The Chairman of the Board receives an annual fee payable monthly with no additional fees for chairing board committees. They also receive reimbursement for travel and incidental costs (including any associated personal tax charges) incurred in furtherance of company business.</p>	None

## Notes to the policy table:

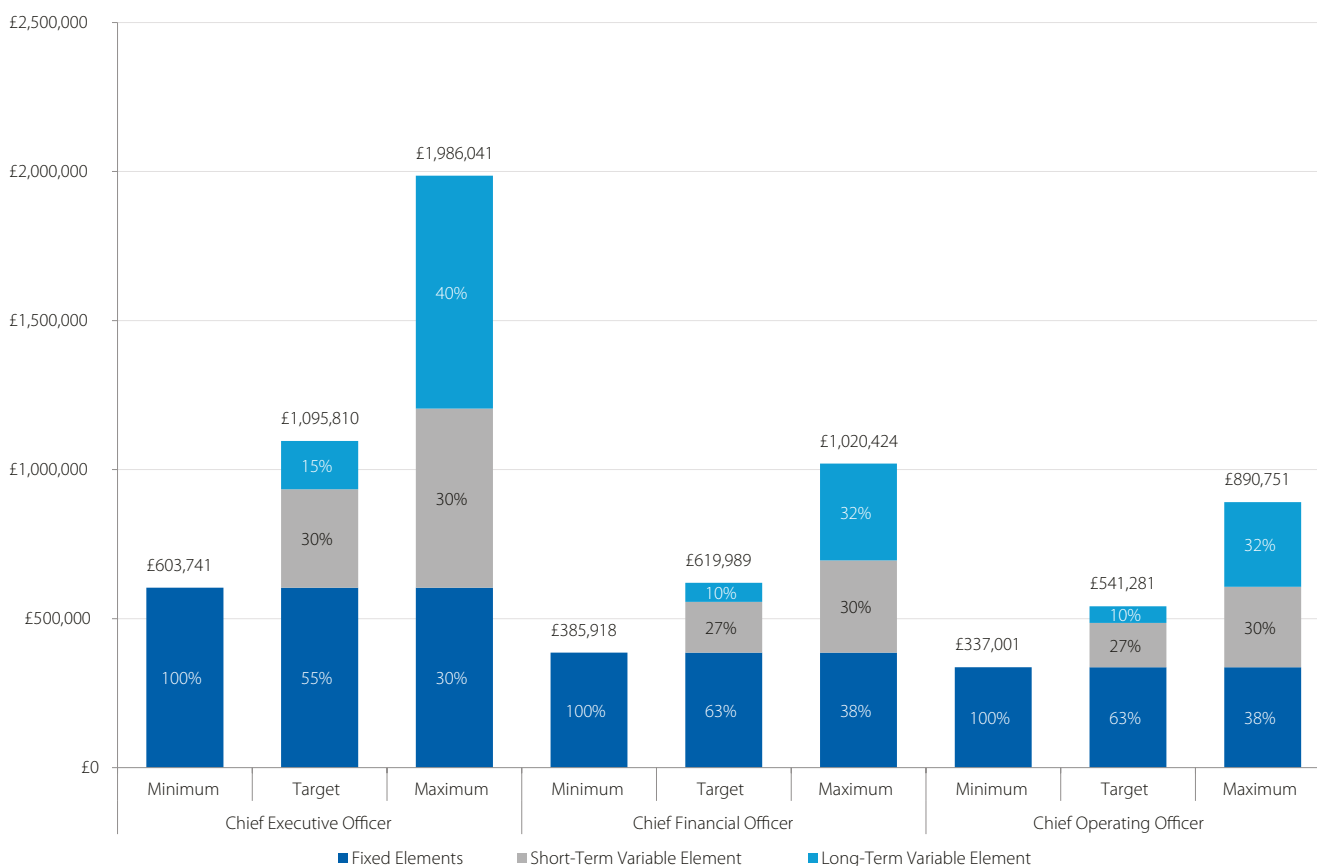
- The changes to the 2014 Directors' Remuneration Policy consist of:
  - ceilings on the elements of our policy which are not yet capped, namely base salary and benefits;
  - simplifying our long-term incentive arrangements so that the so-called deferred bonus matching shares will become the Bonus-Linked Shares; and
  - aligning and extending the malus / clawback provisions which already apply to certain of our share plans across the LTIP, the annual cash bonus, deferred bonus shares and Bonus-Linked Shares.
- Where maximum amounts for elements of remuneration have been set within the Policy, these will operate simply as caps and are not indicative of any aspiration.
- A description of how the Company intends to implement the Policy set out in the above table during the financial year to 30 June 2018 is provided on page 105.
- The Committee reserves the right to make any remuneration payments and/or payments for loss of office (including exercising any discretions available to it in connection with such payments) notwithstanding that they are not in line with the Policy set out above where the terms of the payment were agreed (i) before 29 October 2014 (the date the Company's first shareholder-approved Directors' Remuneration Policy came into effect); (ii) before the Policy set out above came into effect, provided that the terms of the payment were consistent with the shareholder-approved Directors' Remuneration Policy in force at the time they were agreed; or (iii) at a time when the relevant individual was not a director of the Company and, in the opinion of the Committee, the payment was not in consideration for the individual becoming a director of the Company. For these purposes 'payments' include the Committee satisfying awards of variable remuneration and, in relation to an award over shares, the terms of the payment are 'agreed' at the time the award is granted.
- Ricardo's variable pay may have any performance conditions applicable to the relevant element amended or substituted by the Committee if an event occurs which causes the Committee to determine that an amended or substituted performance condition would be more appropriate and not materially less difficult to satisfy. The Committee may make adjustments, where these are fair and reasonable, to measures or targets to take account of, for example, the implications of acquisitions and disposals of subsidiaries.
- Long-term incentive awards can be granted in a variety of forms such as performance shares, nil-cost options or forfeitable shares and the Committee reserves the right to grant long-term incentive awards with the same economic effect but in any of these different contractual forms (including in cash). Long-term incentive awards can also be adjusted in the event of any variation of the Company's share capital or any demerger, delisting, special dividend or other event that may affect the Company's share price.
- Under the terms of long-term incentive award performance conditions, where any company becomes unsuitable as a member of the comparator group as a result of, for example, a change of control or delisting, the Committee has the discretion to treat that company in such manner as it deems appropriate (including replacing it with another organisation).
- In the event of a change of control, long-term incentive awards will normally vest at that time, taking into account the extent to which any performance criteria have been met (over the shortened performance periods) and the time elapsed since grant.

## All-employee share plans

For its UK employees the Company operates from time to time tax-advantaged share plans. These are a Share Incentive Plan ('SIP') and Save As You Earn share option ('SAYE') scheme and they are intended to encourage share ownership and wider interest in the performance of the Company's shares. Executive directors are eligible to participate in these arrangements up to the applicable statutory limits. The SIP provides for partnership, matching, free and dividend shares. Equivalent arrangements operate from time to time for non-UK employees.

### Illustrative remuneration outcomes at different performance levels

Ricardo's pay policy seeks to ensure the long-term interests of executive directors are aligned with those of shareholders. The remuneration packages for each executive director and their fixed and variable elements are reviewed annually. The scenario chart below presents remuneration outcomes for the new Policy under minimum, on-target and maximum scenarios.



The target scenario broadly illustrates the remuneration level when budgeted performance is achieved. The disclosures in the chart above reflect the 2016/2017 data on the basis of the assumptions set out below.

- Fixed elements comprise current base salary, pension and other benefits. For example, for the CEO, fixed elements comprise base salary of £480,800, pension (pension contribution and cash in lieu) of 21.2% of base salary above the Lower Earnings Limit and benefits equal to those received in 2016/2017;
- For minimum performance, executive directors receive only the fixed elements of pay;
- For target performance, an assumption of 55% of bonus payout and threshold vesting (25%) in respect of long-term incentives has been applied;
- For maximum performance, an assumption of maximum bonus payout and maximum vesting in respect of long-term incentives has been applied; and
- No share price increase has been assumed and this means that the single total figure in any year may be higher than the maximum shown above.



### Recruitment remuneration policy

New executive directors will be appointed on remuneration packages with the same structure and elements as described in the policy table starting on page 87. Annual bonus and long-term incentive awards will be within the limits described in the policy table.

For external appointments, although we have no plans to offer additional benefits on recruitment (and indeed did not do so for our last executive director appointment) the Committee reserves the right to offer such benefits when it considers this to be in the best interests of the Company and shareholders and in order to protect a new director against additional costs. The Committee may agree that the Company will meet certain relocation expenses as appropriate.

The Company may make an award to compensate a new recruit for the value of any remuneration relinquished when leaving a former employer. Any such award would reflect the nature, timescales and performance requirements attaching to that relinquished remuneration. The Listing Rules exemption 9.4.2 may be used for the purpose of such an award. Shareholders will be informed of any such payments as soon as practicable following the appointment.

For an internal appointment, any variable pay element awarded in respect of the prior role may be allowed to pay out according to its terms, adjusted as relevant to take into account the appointment. In addition, any other ongoing remuneration obligations existing prior to appointment may continue, and will be disclosed to shareholders at the earliest opportunity.

On the appointment of a new Chairman or non-executive director, fees will be set taking into account the experience and calibre of the individual. Where specific cash or share arrangements are delivered to non-executive directors, these will not include share options or other performance-related elements.

The Board's policy on setting notice periods for directors is that these should not exceed one year. It recognises, however, that it may be necessary in the case of new executive appointments to offer an initial longer notice period, which would subsequently reduce to one year after the expiry of that period. All future appointments to the Board will comply with this requirement.

### Termination remuneration policy

The contractual termination provision is payment in lieu of notice equal to one year's base salary or, if termination is part way through the notice period, the amount of base salary relating to any unexpired notice to the date of termination.<sup>(1)</sup>

There is an obligation on directors to mitigate any loss which they may suffer if the Company terminates their service contract. The Committee will take such mitigation obligation into account when determining the amount and timing of any compensation payable to any departing director. No compensation is paid for summary dismissal, save for any statutory entitlements.

The cash element of the bonus is not payable unless the individual remains in employment at the payment date.

Share-based awards will lapse unless the individual concerned leaves for one of a number of specified 'good leaver' reasons which are: death; injury, illness or disability; redundancy; or retirement. The Committee retains the discretion to prevent awards from lapsing depending on the circumstances of the departure and the best interests of the Company. Awards which do not lapse on cessation of employment may vest on their originally anticipated vesting date (although the Remuneration Committee retains the discretion to allow vesting at cessation, depending on the circumstances under the applicable rules).

These awards will also usually be subject to a time pro-rating reduction to reflect the unexpired portion of the performance or deferral period concerned, although the Committee will retain the discretion to disapply this pro-rating. Awards that are subject to performance conditions will usually only vest to the extent that these conditions are satisfied.

Executive directors will also be entitled to a payment in respect of accrued but untaken holiday and any statutory entitlements on termination.

In the event that any payment is made in relation to termination for an executive director, this will be fully disclosed.

(1) For Ian Gibson the contractual termination provision is payment in lieu of notice equal to one year's base salary, car allowance and pension allowance, to the extent that these benefits are paid in cash.

## Executive directors' service contracts

The current executive directors' service contracts contain the key terms shown in the table below:

Provision	Detailed terms
<b>Remuneration</b>	<ul style="list-style-type: none"> <li>• Salary, pension and benefits;</li> <li>• Company car or cash allowance;</li> <li>• Private health insurance for director and dependants;</li> <li>• Life assurance / death in-service benefits;</li> <li>• Permanent health / disability insurance;</li> <li>• Director's liability insurance;</li> <li>• 30 days' paid annual leave;</li> <li>• Participation in annual bonus plan, subject to plan rules and at the discretion of the remuneration committee; and</li> <li>• Eligible to participate in share plans, subject to plan rules and at the discretion of the remuneration committee.</li> </ul>
<b>Notice period</b>	<ul style="list-style-type: none"> <li>• 6 months' notice by the director and 12 months' notice by the Company.</li> </ul>
<b>Termination payment</b>	<ul style="list-style-type: none"> <li>• See separate disclosure on page 93.</li> </ul>
<b>Restrictive covenants</b>	<ul style="list-style-type: none"> <li>• During employment and for 6 months after leaving.<sup>(1)</sup></li> </ul>

(1) Except for Ian Gibson who is restricted for 12 months after leaving

The executive directors' service contracts are available for inspection, on request, at the Company's registered office.

## Non-executive directors – fees and letters of appointment

The Committee determines the Chairman's fees. The Chairman and the executive directors determine the fees paid to the other non-executive directors. No director is present at meetings for any discussion or decision about his or her own remuneration. The fees are reviewed each January.

The non-executive directors do not participate in any of the Company's share schemes, pension schemes or bonus arrangements, nor do they have service agreements. They are appointed for a period of three years by letter of appointment and are entitled to one month's notice of early termination for which no compensation is payable. The unexpired terms of the non-executive directors' appointments, as at 30 June 2017, are:

Non-executive directors	Unexpired terms of appointments
Sir Terry Morgan	30 months
Peter Gilchrist	28 months
Ian Lee	1 month
Laurie Bowen	12 months
Malin Persson	18 months
Bill Spencer	34 months



## PART 3 – ANNUAL REPORT ON REMUNERATION

This section of the report explains how Ricardo's 2014 remuneration policy has been implemented during the financial year. The paragraphs in this Annual Report on Remuneration that have been audited are indicated as such below.

### The Remuneration Committee

During the year under review the Committee was chaired by Peter Gilchrist. The Committee also comprised Sir Terry Morgan, Ian Lee, Laurie Bowen, Malin Persson and Bill Spencer (who joined the Committee on appointment as a non-executive director on 24 April 2017).

The non-executive directors serving on the Committee have no personal financial interest (other than as shareholders) in matters to be decided, no potential conflicts of interest arising from cross-directorships and no day-to-day involvement in running the business. Biographical details of the members of the Committee are shown on pages 70 and 71; details of attendance at the meetings of the Committee during the year ended 30 June 2017 are shown on page 73.

### Advisors to the Remuneration Committee

The Committee is supported by the Group HR Director (Timothy Hargreaves), the Group Head of Remuneration and Pensions (Mark Jarvis) and the Company Secretary (Patricia Ryan). The Chief Executive Officer (Dave Shemmans) is not a member of the Committee but may attend its meetings by invitation and is consulted in respect of certain proposals. Similarly, the Chief Financial Officer (Ian Gibson) is not a member of the Committee but may occasionally be invited to attend parts of its meetings to address specific matters. Neither the Chief Executive Officer nor the Chief Financial Officer is consulted or involved in any discussions in respect of their own remuneration.

During the year, FIT Remuneration Consultants and Shepherd and Wedderburn (who were originally jointly appointed by the Committee following a competitive tender process held in a previous period) provided independent advice on matters under consideration by the Committee and updates on good practice, legislative requirements and market practice.

FIT Remuneration Consultants' fees for this work amounted to £39,152 (calculated based on a mixture of fixed fees and time spent). Shepherd and Wedderburn's fees for advising the Committee amounted to £31,023 (also calculated based on a mixture of fixed fees and time spent) – and they also advise Ricardo on the design, implementation and operation of its various share incentive plans.

FIT Remuneration Consultants are members of the Remuneration Consultants Group and their work is governed by the Code of Conduct. Shepherd and Wedderburn is a law firm and is regulated accordingly. Having carefully considered all relevant factors, the Remuneration Committee is satisfied that the advice provided on executive remuneration is objective and independent and that no conflict of interest arises as a result of other services.

### Voting outcome at AGM

The AGM for the financial year 2015/2016 was held on 3 November 2016 and the Committee is grateful to shareholders for the very strong support given at that meeting to Ricardo's remuneration report. The result of the vote on the remuneration report is set out below. The remuneration policy in operation during the year was approved by shareholders at the AGM that was held on 29 October 2014; details of this approval are also set out below.

	Remuneration Report approved at 2016 AGM		Remuneration Policy approved at 2014 AGM	
	% of votes (excluding withheld)	Number of votes	% of votes (excluding withheld)	Number of votes
For, including discretion	98.6%	38,785,928	98.3%	38,634,371
Against	1.4 %	570,210	1.7%	663,779
Total votes cast		39,356,138		39,298,150
Withheld <sup>(1)</sup>		44,716		18,413

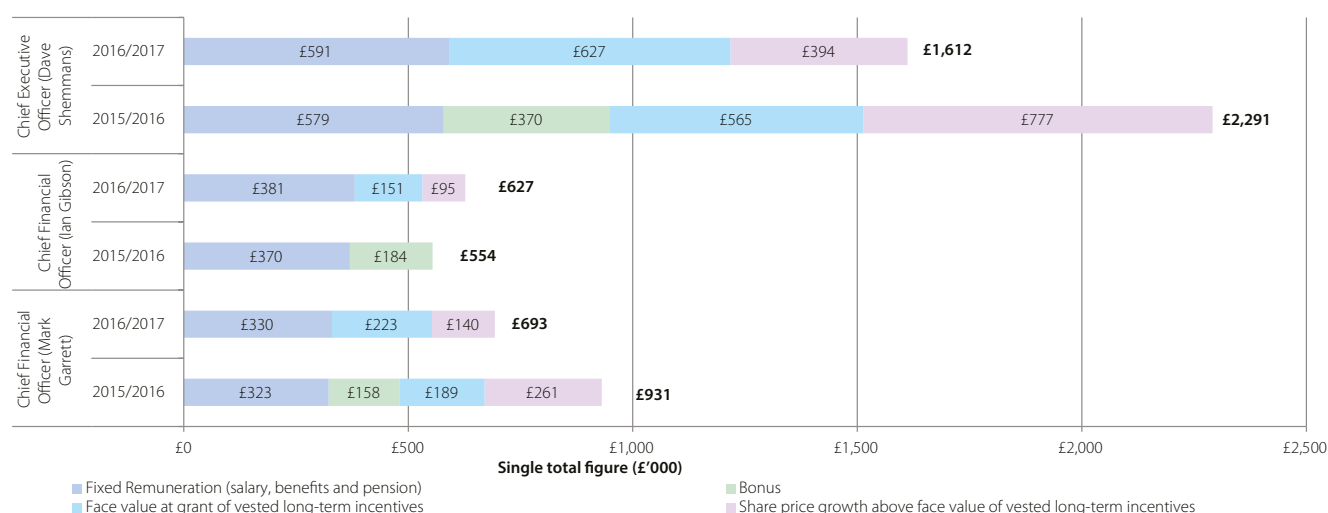
(1) A vote withheld is not a vote in law and so is not counted for the purposes of the calculation of the proportion of votes 'for' and 'against' a resolution.

### Performance at a glance in 2016/2017

Bonus performance measures		Long-term incentive performance measures for October 2016 vested awards	
PBT (adjusted)	Cash balance (adjusted)	3-year EPS growth	3-year TSR growth
£38.1m (2017)	£(34.8)m (2017)	RPI +14.6% p.a. (overall 56% to 30 June 2016)	89.2% (above upper quartile) (to October 2016)
£32.1m (2016)	£(31.4)m (2016)	RPI +11% p.a. (overall 43.7% to 30 June 2015)	150.1% (above upper quartile) (to October 2015)

The closing mid-market price of the Company's shares on 30 June 2017 was 777 pence (at 30 June 2016 it was 739 pence). The highest closing price during the year was 1,030 pence and the lowest closing price during the year was 653 pence.

## Pay at a glance in 2016/2017



## Single total figure table (audited)

The table below sets out the remuneration received by the executive directors and non-executive directors during the year. This should be considered in conjunction with the TSR performance graph on page 97.

	Financial year	Fixed remuneration			Variable remuneration						TOTAL (£'000)
		Base salary and fees (£'000)	Benefits <sup>(1)</sup> (£'000)	Pension (£'000)	Bonus (cash element) <sup>(2)</sup> (£'000)	Bonus (deferred element) (£'000)	TOTAL BONUS (£'000)	Bonus-Linked Shares (£'000)	LTIP (£'000)	TOTAL LTIs (£'000)	
<b>EXECUTIVE DIRECTORS</b>											
Dave Shemmans	2016/2017	474	22	95	-	-	-	325	696	1,021	1,612
	2015/2016	460	22	97	185	185	370	356	986	1,342	2,291
Ian Gibson	2016/2017	305	16	60	-	-	-	-	246	246	627
	2015/2016	296	16	58	92	92	184	-	-	-	554
Mark Garrett	2016/2017	266	14	50	-	-	-	148	215	363	693
	2015/2016	258	14	51	79	79	158	162	288	450	931
<b>NON-EXECUTIVE DIRECTORS</b>											
Sir Terry Morgan	2016/2017	141	1	-	-	-	-	-	-	-	142
	2015/2016	137	1	-	-	-	-	-	-	-	138
Peter Gilchrist	2016/2017	59	2	-	-	-	-	-	-	-	61
	2015/2016	57	3	-	-	-	-	-	-	-	60
Ian Lee	2016/2017	53	3	-	-	-	-	-	-	-	56
	2015/2016	51	5	-	-	-	-	-	-	-	56
Laurie Bowen <sup>(3)</sup>	2016/2017	45	66	-	-	-	-	-	-	-	111
	2015/2016	43	47	-	-	-	-	-	-	-	90
Malin Persson	2016/2017	45	8	-	-	-	-	-	-	-	53
	2015/2016	22	2	-	-	-	-	-	-	-	24
Bill Spencer <sup>(4)</sup>	2016/2017	10	-	-	-	-	-	-	-	-	10
	2015/2016	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

(1) Further information on benefits for the executive directors can be found on page 98. The benefits figures for non-executives represent reimbursement of expenses incurred (including any associated personal tax charges) while travelling for business and committee meetings.

(2) Further details of the annual bonus can be found on page 98.

(3) Laurie Bowen's benefits figure largely consists of travel expenditure to and from the United States.

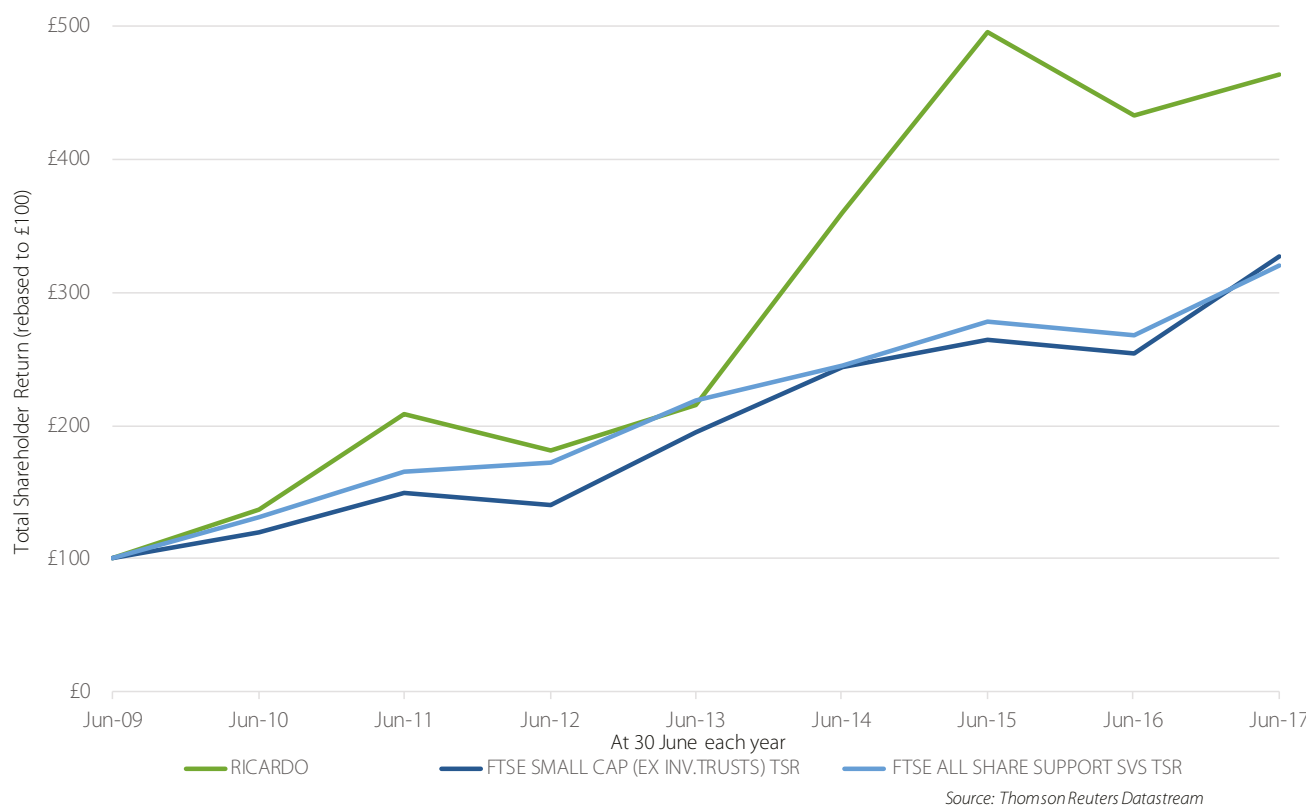
(4) Bill Spencer was appointed as a director on 24 April 2017.

Following the year-end, the Committee considered whether there were any circumstances that could or should result in the recovery or withholding of any sums pursuant to the Company's clawback arrangements. The conclusion reached by the Committee was that it was not aware of any such circumstances.



## Pay for Performance – TSR performance graph & CEO pay history

TSR for the years 30 June 2009 to 30 June 2017



The chart above shows Ricardo's TSR performance for the past eight years against the FTSE Small Cap index (excluding investment trusts). In the Committee's opinion, the FTSE Small Cap index (excluding investment trusts) represents an appropriate index against which the Company should be compared when considering the Company's size. The FTSE All Share Support Services index is also shown for information. The CEO Dave Shemmans' remuneration for the same period is represented in the table below.

Financial Year	Single figure of total remuneration CEO (£'000)	Annual variable element award rates against maximum opportunity	Long term incentive vesting rates against maximum opportunity
2016/2017	1,612	0%	100%
2015/2016	2,291	63%	100%
2014/2015	1,367	59%	67%
2013/2014	760	38%	N/A
2012/2013	1,546	75%	77%
2011/2012	979	58%	35%
2010/2011	1,116	97%	46%
2009/2010	708	19%	36%

## CEO remuneration compared to employees

The table below compares the percentage change in the CEO's remuneration and the percentage change in employees' remuneration between 2015/2016 and 2016/2017. The year-on-year decrease in the CEO's bonus reflects the fact that he received no annual bonus for 2016/2017. The average bonus paid to all employees across the Group also decreased year-on-year. The change in the employees' annual bonus represents the average percentage change in bonuses for employees across the Group as a whole with individual performance against target varying between divisions.

	CEO	Employees
Base salary	3%	3% <sup>(1)</sup>
Benefits	0%	0%
Annual bonus	(100)% <sup>(2)</sup>	(25)%

(1) This represents the average increase that was approved in 2016/2017; however a number of divisions took the decision to delay implementation until 1 July 2017.

(2) The year-on-year change in CEO bonus of (100)% reflects the fact that no annual bonus was paid to the CEO in respect of the 2016/2017 financial year.

## Relative importance of pay spend

The following table sets out the total amounts spent on remuneration for all employees, the dividends declared and other significant distributions to shareholders in 2015/2016 and 2016/2017.

	2015/2016	2016/2017	% change
Total remuneration spend	£160m	£166.5m	4.1%
Key management remuneration as a percentage of total remuneration spend <sup>(1)</sup>	3%	3%	0%
R&D expenditure <sup>(2)</sup>	£9.4m	£9.5m	1.1%
Distribution to shareholders <sup>(3)</sup>	£9.5m	£10.3m	8.4%

(1) The key management personnel are the Board of Directors, together with the Managing Directors who report directly to the Chief Executive Officer. Further details on the key management remuneration can be found on page 132.

This measure was chosen in order to give greater context for the scale of key management remuneration within Ricardo.

(2) Further details on the R&D expenditure can be found on pages 15 and 28. This measure was chosen because of the importance to Ricardo's business of developing its R&D portfolio.

(3) The only distributions made by the Company over this period were in the form of dividends.

## Detailed breakdown of pay in 2016/2017

### Base salary

Base salaries were reviewed in January 2017. As described in the policy section, a number of factors are taken into account when salaries are reviewed: principally, market levels of total pay for comparable roles in companies of similar size, complexity and sector; the individual director's experience, scope of responsibilities and performance; and the salary increases for employees across the Group. The increase for each executive director (and the Group-wide average approved in 2016/2017) was 3%.

Current salary levels from 1 January 2017 are:

- Dave Shemmans: £480,800
- Ian Gibson: £309,515
- Mark Garrett: £270,122

## Other benefits (audited)

The Company provides other cash benefits and benefits in kind to executive directors. These include a company car or cash alternative, private fuel, private medical insurance, life assurance and permanent health / disability insurance. The car allowance levels remain unchanged and set at £17,500 p.a. for Dave Shemmans and at £12,000 p.a. for Ian Gibson and Mark Garrett.

Non-executive directors can recover travel expenses for board meetings and do not receive any other benefits. If tax is payable by a non-executive director on travel expenses for board meetings, these may be paid gross of tax.

## Pension (audited)

(a) The Defined Benefit scheme is closed and there are no active members. During the year ended 30 June 2017, the transfer value in respect of the Chief Executive Officer has increased. The transfer value at 30 June 2017 was £602,000, an increase of £99,000 from the prior year.

The CEO's Normal Retirement Date ('NRD') is 16 June 2031 at which point he will receive his pension at the date of leaving the fund, increased for the period in deferment until his NRD. If he decides to retire early, he will receive an immediate pension calculated as for retirement at NRD but reduced for early payment.

(b) With respect to Defined Contribution pension schemes:

	Employer contributions payable in the year (£'000)	Cash in lieu (£'000)
Dave Shemmans	5	90
Ian Gibson	N/A	60
Mark Garrett	3	47

## Annual performance-related bonus (audited)

For the year ended 30 June 2017, the maximum annual performance-related bonus opportunity was 125% of salary for the Chief Executive Officer and 100% of salary for the other executive directors. To determine the amount of bonus payable for the period the Remuneration Committee assessed the level of achievement against the financial measures and targets set



in respect of Group profit before tax (60%) and Group cash balance at year-end (15% for CEO / 20% for other executive directors) and the achievement of specified individual objectives (25% for CEO / 20% for other executive directors). The choice of these measures, and their respective weightings for each individual, reflected the Committee's belief that any incentive compensation should be tied both to the overall performance of the Group and to those areas of the business that the relevant individual can directly influence.

The targets set by the Remuneration Committee take into account several factors such as the business plan, management's expectations and brokers' forecasts.

A sliding scale of targets for each financial measure of the Group was set at the start of the 2016/2017 financial year:

Performance achieved	% of element payable
Threshold	0%
On-target	50%
Maximum	100%
Between any two points	Straight line percentage

The personal objectives of the executive directors were different for each individual and were ascribed different weightings. Examples of the types of personal objectives that were set include:

- Order book and profitability in key parts of the business;
- Identifying further opportunities for inorganic growth;
- Further developing management succession planning with a focus on Group-wide diversity;
- Integrating acquisitions and delivering synergies in overhead savings and benefits;
- Identifying opportunities and risks presented by the UK's referendum vote to leave the European Union;
- Continuing to improve management and corporate reporting;
- Ensuring the R&D programme is balanced and competitive; and
- Continuing to improve programme delivery.

The following table sets out the targets and the performance outcomes in respect of the executive directors' bonus scheme for the 2016/2017 financial year.

Measure	Weighting (% of maximum opportunity)			Performance required			Actual performance (adjusted) <sup>(1)</sup>	Payout (% of maximum opportunity)		
	CEO	CFO	COO	Threshold	On-Target	Maximum		CEO	CFO	COO
Profit before tax	60%	60%	60%	£38.0m	£40.0m	£42.0m	£38.1m <sup>(2)</sup>	0%	0%	0%
Group net debt balance	15%	20%	20%	£(34.6)m	£(30.6)m	£(28.6)m	£(34.8)m	0%	0%	0%
Personal objectives	25%	20%	20%	0%	75%	100%	N/A	0%	0%	0%
Total payout (% of maximum opportunity) = (a)								0%	0%	0%
Maximum opportunity (% of base salary) = (b)								125%	100%	100%
Total payout (% of base salary) = (a) x (b)								0%	0%	0%

(1) The actual underlying profit before tax of £38.3m was adjusted by £0.2m to £38.1m for acquisition-related expenditure. The actual net debt balance of £(37.9)m was adjusted by £3.1m to £(34.8)m for unbudgeted Exnovo net consideration, acquisition-related expenditure and reorganisation costs. The purpose of the adjustments to profit before tax and net debt, which were reviewed by the Chairman of the Audit Committee, was to ensure that actual performance and the original targets were compared on a like-for-like basis.

(2) As the profit performance is just above the threshold, the Remuneration Committee has exercised its discretion such that no bonus is payable.

The performance of the Group over the year included a 2% increase in underlying profit before tax to £38.3m (2016: £37.7m) and a year-end net debt of £(37.9)m (2016: £(34.4)m).

The underlying profit before tax of £38.3m was adjusted by £0.2m for acquisition-related expenditure, to give an adjusted underlying profit before tax of £38.1m. The net debt of £(37.9)m was adjusted by £3.1m for unbudgeted expenditure related to the Exnovo acquisition, acquisition-related expenditure and reorganisation costs to give an adjusted net debt of £(34.8)m. As the profit performance is just above the threshold, the Remuneration Committee has exercised its discretion such that no bonus is payable. The cash performance is below the lower threshold and therefore no bonus is payable. The purpose of the adjustments to profit before tax and net debt, which were reviewed by the Chairman of the Audit Committee, was to ensure that actual performance and the original targets were compared on a like-for-like basis. The Remuneration Committee reviewed these adjustments and the achievement of the cash target was also reviewed by the Audit Committee.

## Directors' remuneration report

The Remuneration Committee carried out a detailed and rigorous review of the achievement of personal objectives and determined that these had been achieved at a level of 76% for the CEO, 75% for the CFO and 70% for the COO. This reflects the Remuneration Committee's assessment that most, but not all, of the objectives were met in full. However, as personal objectives were subject to the profit performance, as set out on the preceding page, the result is that no bonus is payable. Finally, the Remuneration Committee also considered whether the outturn from the assessment of the specific bonus targets reflected the overall performance of the Group during the year and was satisfied that this was the case.

Consequently, as no bonuses were payable to the executive directors for 2016/2017, no deferred bonus awards will be made under the 2011 DBP. This also means that no Bonus-Linked Shares will be awarded in respect of the 2016/2017 bonus year.

### Long-term incentives Awards vesting during the financial year (audited)

Awards under the LTIP made in October 2013 vested in October 2016 on the basis of EPS and TSR performance over performance periods, the last of which ended in October 2016. The performance conditions applicable to these awards are summarised below:

Relative TSR portion (50%)		EPS growth portion (50%)	
Relative TSR performance against the FTSE Small Cap (excluding financial services companies and investment trusts)	Vesting level	EPS growth performance	Vesting level
Below median	Nil	Less than RPI + 4% p.a.	Nil
Median	25%	RPI + 4% p.a.	30% <sup>(1)</sup>
Upper quartile (or above)	100%	RPI + 10% p.a.	100%
Between median and upper quartile	Straight-line basis	Between RPI + 4% and RPI + 10% p.a.	Straight-line basis

(1) Please note that the threshold vesting level for the EPS growth portion of these awards is different from the Directors' Remuneration Policy because these awards were granted in 2013 before the commencement of the 2014 remuneration policy.

Over the three-year performance period, Ricardo was ranked above the upper-quartile of the TSR comparator group, giving a vesting level for this portion of 100%. Ricardo's TSR over the period was 89.2% against an upper quartile of 56.1%. The EPS figure for the year resulted from growth of 50.6% in real terms which represented compound growth of RPI + 14.6% p.a., compared to the base year, with the result that the EPS target was achieved to a level of 100%. Therefore, the overall vesting level for this award was 100%. The number and value of shares which vested in October 2016 in respect of awards granted to each of the executive directors in October 2013 are set out on page 102 of this report. The Remuneration Committee also concluded that there had been a sustained improvement in the overall performance of the Group over the three years in question.

### Non-executive directors' fees

Current non-executive directors' fees as from 1 January 2017 are as follows:

	£'000
Chairman's total fees	143
<i>Other non-executive director fees:</i>	
Basic fee	46
Additional fee for Audit and Remuneration Committee Chairmen	8
Additional fee for the Senior Independent Director	8

The above table reflects a 3% increase in the Chairman's total fees and the basic fee for non-executive directors relative to 2015/2016, a £790 increase in Committee Chair fees and a £1,320 increase in the Senior Independent Director's fee.

### Payments to past directors and in respect of loss of office (audited)

No payments have been made to past directors or in respect of loss of office in the financial year.



## Long-term incentives Awards granted during the financial year (audited)

Awards were made to the executive directors under the 2011 DBP (Bonus-Linked Shares) and 2014 LTIP in October 2016. The awards granted to each executive were as follows:

### 2011 DBP

	<b>Chief Executive Officer</b> <b>David Shemmans</b>	<b>Chief Financial Officer</b> <b>Ian Gibson</b>	<b>Chief Operating Officer</b> <b>Mark Garrett</b>
Type awarded	Performance Shares (Bonus-Linked Shares) <sup>(1)</sup>		
Basis for award	1:1 match for corresponding Deferred Award		
Date of award	25 October 2016		
Number of shares	19,336	9,604	8,244
Share price <sup>(2)</sup>	£9.543	£9.543	£9.543
Face value of award	£184,523	£91,651	£78,672
% which would vest for the achievement of threshold performance	25%	25%	25%
End of performance period	35 days after release of preliminary results announcement in respect of the 2018/2019 financial year (expected to be October 2019)		

(1) As the Bonus-Linked Shares are granted in the form of performance share awards, no 'exercise price' is payable in order to receive any vested shares.

(2) Average of the share prices over the five days up to and including 24 October 2016.

### 2014 LTIP

	<b>Chief Executive Officer</b> <b>David Shemmans</b>	<b>Chief Financial Officer</b> <b>Ian Gibson</b>	<b>Chief Operating Officer</b> <b>Mark Garrett</b>
Type awarded	Performance Shares <sup>(1)</sup>		
Basis for award	100% of base salary	55% of base salary	55% of base salary
Date of award	25 October 2016		
Number of shares	48,915	17,318	15,114
Share price <sup>(2)</sup>	£9.543	£9.543	£9.543
Face value of award	£466,796	£165,266	£144,233
% which would vest for the achievement of threshold performance	25%	25%	25%
End of performance period	35 days after release of preliminary results announcement in respect of the 2018/2019 financial year (expected to be October 2019)		

(1) As the 2014 LTIP Awards are granted in the form of performance share awards, no 'exercise price' is payable in order to receive any vested shares.

(2) Average of the share prices over the five days up to and including 24 October 2016.

The vesting of these awards will be based on Ricardo's three-year relative TSR (50%) and EPS growth (50%) performance summarised in the table below. The relative TSR measure was chosen by the Committee to link the remuneration of executive directors to the performance experienced by shareholders and further align their interests. The EPS measure was chosen to reward sustained profit growth in excess of inflation and align with one of our key performance indicators. In addition, no part of an award will vest unless the Remuneration Committee is satisfied that the achievement against the TSR and EPS performance condition is a genuine reflection of the underlying performance of the Group over the performance period.

Relative TSR portion (50%)		EPS growth portion (50%)	
Relative TSR performance against the FTSE Small Cap (excluding financial services companies and investment trusts)	Vesting level	EPS growth performance	Vesting level
Below median	Nil	Less than RPI + 3% p.a.	Nil
Median	25%	RPI + 3% p.a.	25%
Upper quartile (or above)	100%	RPI + 10% p.a.	100%
Between median and upper quartile	Straight-line basis	Between RPI + 3% and RPI + 10% p.a.	Straight-line basis

## Performance target setting and those applying to outstanding awards

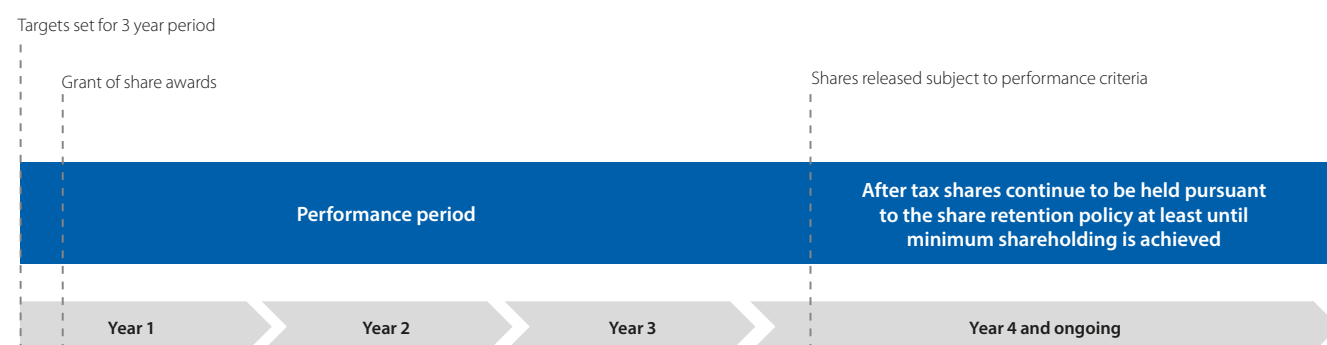
As shown in previous directors' remuneration reports, the Committee has a track record of setting stretching EPS targets which are carefully calibrated to outperform the business plan and market expectations. Similarly the TSR measure only awards full vesting where our performance is in the upper quartile of the FTSE Small Cap (excluding financial services companies and investment trusts).

The performance targets applicable to outstanding LTIP and Bonus-Linked Share awards are as follows. For awards in years ending 30 June 2014, 2015, 2016 and 2017, maximum vesting of the EPS portion required growth of RPI + 10% per annum. The EPS target to achieve threshold vesting for awards granted in the year ending 30 June 2014 required performance in excess of RPI + 4% per annum. However this target was reduced to RPI + 3% p.a. for awards made in the financial year ended 30 June 2015. This change was the result of extensive consideration of the EPS target in particular in light of market expectations and management plans. This reduction was also offset by a reduction in the threshold vesting level applicable to these awards. The EPS growth required for threshold vesting remained unchanged at RPI + 3% p.a. for awards made in the years ending 30 June 2016 and 2017.

The performance condition applicable to the TSR portion of awards has remained constant through this period and is the same as set out on page 101 for awards granted in the year ending 30 June 2017. The number and value of shares which were awarded to each of the executive directors in the year ended 30 June 2017 are set out on page 101.

## Directors' interests in shares provisionally awarded under the LTIP (audited)

The following chart sets out in graphical form how the LTIP operates:



For details of the share retention policy, see page 104.

The directors' interests in shares provisionally awarded under the LTIP are as follows:

	3-year cycle ending	Award date	Share price at award date in pence	Number of provisional shares					
				At 1 July 2016	Awarded	Lapsed	Vested	At 30 June 2017 <sup>(4)</sup>	Vesting date
<b>Dave Shemmans</b>	2016	Oct 13 <sup>(1)</sup>	582.10	73,380	-	-	73,380	-	25.10.16
	2017	Oct 14 <sup>(2)</sup>	635.20	69,269	-	-	-	69,269	29.10.17
	2018	Oct 15 <sup>(2)</sup>	904.80	50,088	-	-	-	50,088	19.10.18
	2019	Oct 16 <sup>(2)(3)</sup>	954.30	-	48,915	-	-	48,915	25.10.19
<b>Ian Gibson</b>	2016	Oct 13 <sup>(1)</sup>	582.10	25,983	-	-	25,983	-	25.10.16
	2017	Oct 14 <sup>(2)</sup>	635.20	24,525	-	-	-	24,525	29.10.17
	2018	Oct 15 <sup>(2)</sup>	904.80	17,734	-	-	-	17,734	19.10.18
	2019	Oct 16 <sup>(2)(3)</sup>	954.30	-	17,318	-	-	17,318	25.10.19
<b>Mark Garrett</b>	2016	Oct 13 <sup>(1)</sup>	582.10	22,676	-	-	22,676	-	25.10.16
	2017	Oct 14 <sup>(2)</sup>	635.20	21,404	-	-	-	21,404	29.10.17
	2018	Oct 15 <sup>(2)</sup>	904.80	15,477	-	-	-	15,477	19.10.18
	2019	Oct 16 <sup>(2)(3)</sup>	954.30	-	15,114	-	-	15,114	25.10.19

(1) Awards made under the 2006 LTIP; performance conditions as outlined on page 102.

(2) Awards made under the 2014 LTIP; performance conditions as outlined on page 101.

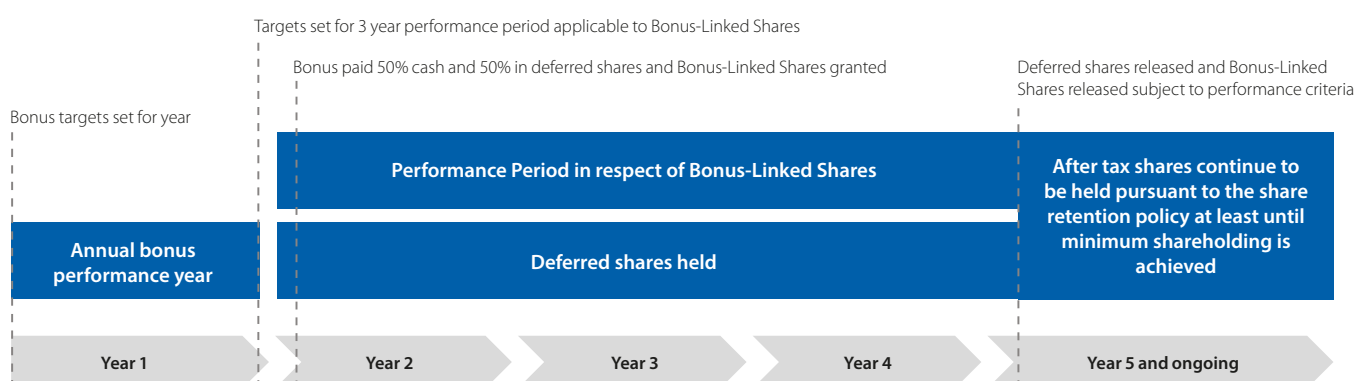
(3) The face value at the date of grant of the awards made in October 2016 was Dave Shemmans: £466,796; Ian Gibson: £165,266; Mark Garrett: £144,233.

(4) The mid-market closing price of the Company's shares on 30 June 2017 was 777p (2016: 739p).

The value of the October 2013 award vesting was £695,664.41 for Dave Shemmans, £246,326.63 for Ian Gibson and £214,975.28 for Mark Garrett inclusive of an additional compensatory cash payment (Dave Shemmans: £9,561.41; Ian Gibson: £3,385.58; Mark Garrett: £2,954.68) made because, due to a technical timing issue, these awards did not receive any benefit from the November 2016 final dividend. The market price per share of these shares that vested on 25 October 2016 was 935p.

## Directors' interests in shares provisionally awarded under the DBP (audited)

The following chart sets out in graphical form how the DBP operates:



For details of the share retention policy, see page 104.

The directors' interests in shares provisionally awarded under the DBP are as follows:

	Type of Award	Award date	Deferral / performance period	Share price at award date in pence	Number of provisional shares					
					At 1 July 2016	Awarded	Dividend shares <sup>(1)</sup>	Lapsed	Vested	At 30 June 2017 <sup>(4)</sup>
Dave Shemmans	Deferred	Oct 13	3 yrs	582.10	36,613	-	-	-	36,613	-
	Bonus-Linked Shares <sup>(2)</sup>	Oct 13	3 yrs	582.10	34,292	-	-	-	34,292	-
	Deferred	Oct 14	3 yrs	635.20	17,366	-	353	-	-	17,719
	Bonus-Linked Shares <sup>(2)</sup>	Oct 14	3 yrs	635.20	16,640	-	-	-	-	16,640
	Deferred	Oct 15	3 yrs	904.80	18,877	-	385	-	-	19,262
	Bonus-Linked Shares <sup>(2)</sup>	Oct 15	3 yrs	904.80	18,509	-	-	-	-	18,509
	Deferred	Oct 16	3 yrs	954.30	-	19,336 <sup>(3)</sup>	394	-	-	19,730
Bonus-Linked Shares <sup>(2)</sup>	Oct 16	3 yrs	954.30	-	19,336 <sup>(3)</sup>	-	-	-	19,336	
Ian Gibson	Deferred	Oct 14	3 yrs	635.20	8,434	-	171	-	-	8,605
	Bonus-Linked Shares <sup>(2)</sup>	Oct 14	3 yrs	635.20	8,082	-	-	-	-	8,082
	Deferred	Oct 15	3 yrs	904.80	9,617	-	195	-	-	9,812
	Bonus-Linked Shares <sup>(2)</sup>	Oct 15	3 yrs	904.80	9,431	-	-	-	-	9,431
	Deferred	Oct 16	3 yrs	954.30	-	9,604 <sup>(3)</sup>	195	-	-	9,799
	Bonus-Linked Shares <sup>(2)</sup>	Oct 16	3 yrs	954.30	-	9,604 <sup>(3)</sup>	-	-	-	9,604
Mark Garrett	Deferred	Oct 13	3 yrs	582.10	16,675	-	-	-	16,675	-
	Bonus-Linked Shares <sup>(2)</sup>	Oct 13	3 yrs	582.10	15,620	-	-	-	15,620	-
	Deferred	Oct 14	3 yrs	635.20	7,156	-	145	-	-	7,301
	Bonus-Linked Shares <sup>(2)</sup>	Oct 14	3 yrs	635.20	6,859	-	-	-	-	6,859
	Deferred	Oct 15	3 yrs	904.80	8,106	-	165	-	-	8,271
	Bonus-Linked Shares <sup>(2)</sup>	Oct 15	3 yrs	904.80	7,949	-	-	-	-	7,949
	Deferred	Oct 16	3 yrs	954.30	-	8,244 <sup>(3)</sup>	167	-	-	8,411
	Bonus-Linked Shares <sup>(2)</sup>	Oct 16	3 yrs	954.30	-	8,244 <sup>(3)</sup>	-	-	-	8,244

(1) Amounts allocated include shares equivalent to dividends on provisional Deferred Award shares.

(2) Bonus-Linked Shares awarded under the 2011 DBP: performance conditions as outlined on page 102.

(3) The face value at the date of grant of the awards made in October 2016 was Dave Shemmans: £184,523; Ian Gibson: £91,651; Mark Garrett: £78,672.

(4) The mid-market closing price of the Company's shares on 30 June 2017 was 777p (2016: 739p).



## Directors' remuneration report

The value of the October 2013 Deferred Award vesting was £369,791.30 for Dave Shemmans and £168,417.50 for Mark Garrett. The market price per share of these shares that vested on 17 October 2016 was 1010p.

The value of the October 2013 Bonus-Linked Shares vesting was £325,098.45 for Dave Shemmans, and £148,082.29 for Mark Garrett inclusive of an additional compensatory cash payment (Dave Shemmans: £4,468.25; Mark Garrett: £2,035.29) made because, due to a technical timing issue, these awards did not receive any benefit from the November 2016 final dividend. The market price per share of these shares that vested on 25 October 2016 was 935p.

### Directors' shareholdings (audited)

The interests of directors and their connected persons in ordinary shares as at 30 June 2017, including any interests in share options and shares provisionally awarded under the LTIP and DBP are presented below.

At 13 September 2017, the interests in shares of the directors who were still in office were unchanged from those at 30 June 2017.

	Shareholding as at 30 June 2017		Not subject to performance conditions	Subject to performance conditions
	# of shares	% of base salary <sup>(1)</sup>	Deferred Awards <sup>(2)</sup>	Long-term incentives (Bonus-Linked Share & LTIP awards) <sup>(2)</sup>
<b>EXECUTIVE DIRECTORS</b>				
Dave Shemmans	104,085	168%	56,711	222,757
Ian Gibson	13,770	35%	28,216	86,694
Mark Garrett	118,154	340%	23,983	75,047
<b>NON-EXECUTIVE DIRECTORS</b>				
Sir Terry Morgan	15,000	N/A	-	-
Peter Gilchrist	4,970	N/A	-	-
Ian Lee	13,876	N/A	-	-
Laurie Bowen	4,000	N/A	-	-
Malin Persson	1,500	N/A	-	-
Bill Spencer <sup>(3)</sup>	8,000	N/A	-	-

(1) For executive directors only (i.e. those who are subject to the share retention policy). Percentages calculated by reference to the mid-market closing price of the Company's shares on 30 June 2017 which was 777p (2016: 739p).

(2) Deferred Awards and Bonus-Linked Shares were granted pursuant to the 2011 DBP and LTIP awards were granted pursuant to the 2014 LTIP.

(3) Bill Spencer was appointed as a director on 24 April 2017.

### Share retention policy

In order to foster greater alignment between our executive directors and our shareholders, the Board operates a share retention policy for the executive directors with the intention that each executive director will own shares in the Company with a value at least equal to one times annual base salary. Unvested awards granted under the Company's employee share schemes do not count towards this target. As at 30 June 2017, Dave Shemmans and Mark Garrett met this shareholding requirement. While Ian Gibson has made clear strides towards the required minimum shareholding level during the year, having joined the Company on 1 July 2013, he has not yet met this level and will be expected to retain any vested shares net of tax from the LTIP and DBP until the guideline has been achieved.

### Dilution limits

The number of shares that may be issued under all Ricardo employee share plans in any ten-year rolling period will be restricted to 10% of the issued ordinary share capital of the Company and 5% of the issued ordinary share capital of the Company for discretionary employee share plans. At the end of the year under review, the Company's overall dilution was 4.76%

of which 4.32% related to discretionary employee share plans. The Company operates an employee benefit trust ('EBT') which has principally been used to facilitate the operation of the LTIP and DBP arrangements. Any new shares issued to the trust are, however, included in the dilution limits noted above.

### Executive director board positions with other companies during 2016/2017

Executive directors may, with the prior consent of the Board, hold a non-executive directorship with another company.

On 1 September 2014, the Company's Chief Executive Officer was appointed as a non-executive director of Sutton and East Surrey Water plc. He is permitted to retain the associated fees which, for the year from 1 July 2016 to 30 June 2017 (inclusive), amounted to £34,000.

On 28 November 2016, the Company's Chief Operating Officer was appointed as the non-executive chairman of Secured By Design Automotive Limited. He is permitted to retain the associated fees which, for the period of 28 November 2016 to 30 June 2017 (inclusive), amounted to £11,667.

## Implementation of remuneration policy in following year

The Committee anticipates the implementation of the new Policy to be similar to that of the current financial year.

The Committee will:

- Review base salary levels for the executive directors with effect from 1 January 2018;
- Set / review the performance targets for the 2017/2018 annual bonus, the LTIP awards to be made in 2017 to ensure continued alignment to strategy;
- Make awards under the 2014 LTIP; and
- Make awards under the 2011 DBP where necessary.

The Committee has so far considered the targets to apply to the EPS portion of performance awards to be made under the Company's long-term incentive arrangements later on in the year. In order to ensure that the targets remain challenging in light of market expectations of the Company's EPS performance to the year ending June 2020, the Committee has determined that:

- No part of the EPS portion of these grants will vest if the Company's EPS for the final year in the performance period is lower than 65p;
- 25% of this portion will vest where the final year EPS is 65p;
- 100% of this portion will vest where the final year EPS is greater than or equal to 75p; and
- Vesting will take place on a straight-line basis between 65p and 75p.

These targets will require EPS growth in the range of 17.5% to 35.6% or around 6% to 12% per year, which the Committee believes are challenging in the current business climate. This change from previously expressing our targets as growth percentages in excess of RPI has been made to simplify, to enhance the 'line of sight' for participants and also to recognise the international scope of Ricardo. On a compound annual basis the growth rate is slightly lower than the previous range (if RPI of 3% is assumed) but the target range has been set on the basis of Ricardo's business plan, recognising the international nature of the business, and also reflects our long-term strategy and consensus forecasts.

Where the EPS performance period ends before 30 June 2020 (which is currently expected to be the final year in the performance period), the Committee retains the discretion to amend these targets and the corresponding vesting levels accordingly.

The targets applicable to the TSR portion of these awards will be the same as those which applied to awards granted last year.

Threshold performance (for which 25% of this portion will vest) is generally intended to align to the performance of the relevant market and/or our competitors' level. If the maximum performance is achieved, we would expect to have significantly outperformed the relevant market and/or our competitors.

The Committee believes that TSR and EPS are appropriate measures for the LTIP as they are strongly aligned to shareholder value creation. In particular, the normalised EPS performance targets are considered by the Committee to be suitably stretching and will reward the leadership team only if they perform very well. When calibrating performance targets the Committee takes into account the economic and market outlook, the business plan and investor expectations at the time of each award. Shareholders should also note that the long-term incentive awards to be granted in November 2017 will be significantly lower than for 2016 because no bonuses are being paid to executive directors for 2016/2017 and therefore no Bonus-Linked Shares will be awarded.

The Directors' Remuneration Report was approved by the Board on 13 September 2017 and signed on its behalf by:



**Peter Gilchrist**

Chairman of the Remuneration Committee  
13 September 2017

# Directors' report



**Patricia Ryan – Group General Counsel and Company Secretary**

## Dividends

The Directors recommend the payment of a final ordinary share dividend for the year ended 30 June 2017 of 13.88 pence per ordinary share on 17 November 2017 to shareholders who are on the register of members at the close of business on 27 October 2017, which together with the interim dividend paid on 6 April 2017 makes a total of 19.3 pence per ordinary share for the year (2016: 18.1 pence).

## Acquisitions and disposals

The acquisition of Motorcycle Engineering Italia s.r.l., which was formed from the operating assets and employees of Exnovo s.r.l., and subsequently renamed Ricardo Motorcycle Italia s.r.l., was completed in the year under review.

## Events after the reporting date

The acquisition of Control Point Corporation was completed after the reporting date on 8 September 2017.

## Research and Development

The Group continues to devote effort and resources to research and development of new technologies. Costs of £9.5m have been incurred, of which £3.1m has been capitalised and £6.4m has been charged to the Consolidated Income Statement during the year.

## Board of Directors

The current Directors of the Company at the date of this report appear on pages 70 and 71. Bill Spencer joined the Board on 24 April 2017. It is the intention of Ian Lee to resign from the

Board at the close of the Annual General Meeting ('AGM') on 8 November 2017 and it is expected that Bill Spencer will be appointed as Chair of the Audit Committee following the close of the AGM.

All other Directors held office through the financial year under review.

## Directors' interests in shares

Directors' interests in shares and share options are contained on pages 102 to 104 of the Directors' Remuneration Report.

## Directors' indemnities

The Company has entered into deeds of indemnity in favour of each of its Directors under which the Company agrees to indemnify each Director against liabilities incurred by that Director in respect of acts or omissions arising in the course of their office or otherwise by virtue of their office.

Where such deeds are for the benefit of directors they are qualifying third party indemnity provisions as defined by s.309B of the Companies Act 1985 or s.234 of the Companies Act 2006, as applicable. At the date of this report, these indemnities are therefore in force for the benefit of all the current Directors of the Company.

On 30 June 2014, Ricardo UK Limited and Ricardo-AEA Limited, subsidiaries of the Company, entered into qualifying third party indemnity provisions as defined by s.234 of the Companies Act 2006 in favour of their Directors, under which each Director is indemnified against liabilities incurred by that Director in respect of acts or omissions arising in the course of their office or otherwise by virtue of their office and such provisions remain in force as at the date of this report.



## Employee information

The Company provides employees with various opportunities to obtain information on matters of concern to them and to improve awareness of the financial and economic factors that affect the performance of the Company. These include bi-annual 'Pulse' presentations to all members of staff, department and team briefings and meetings with employee representatives that take place throughout the year.

All companies within the Group strive to operate fairly at all times and this includes not permitting discrimination against any employee or applicant for employment on the basis of race, religion or belief, colour, gender, disability, national origin, age, military service, veteran status, sexual orientation or marital status. This includes giving full and fair consideration to suitable applications for employment from disabled persons and making appropriate accommodations so that if existing employees become disabled they can continue to be employed, wherever practicable, in the same job or, if this is not practicable, making every effort to find suitable alternative employment and to provide relevant training.

## Change of control provisions

There are a number of agreements that take effect, alter or terminate upon a change of control of the Company following a takeover bid, such as commercial contracts, bank facility agreements, property lease arrangements and employees' share plans. None of these are considered to be significant in terms of their likely impact on the business of the Group as a whole.

## Management report

The management report required by the provisions of the Disclosure and Transparency Rules is included within the Strategic Report and has been prepared in consultation with management.

## Share capital

As at 28 August 2017, the Company's share capital is divided solely into 53,163,423 ordinary shares of 25 pence each, all of which are fully paid. The ordinary shares are listed on the London Stock Exchange.

All ordinary shares rank equally for all dividends and distributions that may be declared on such shares. At general meetings of the Company, each member who is present (in person, by proxy or by representative) is entitled to one vote on a show of hands and, on a poll, to one vote per share.

With respect to shares held on behalf of participants in the all-employee Share Incentive Plan, the trustees are required to vote as the participants direct them to do so in respect of their plan shares. There are no restrictions on voting rights and no securities carry special voting rights with regard to the control of the Company.

Awards granted under the Company's share plans are satisfied either by shares held in the employee benefit trusts or by the issue of new shares when awards vest. The Remuneration Committee monitors the number of awards made under the various share plans and their potential impact on the relevant

dilution limits recommended by the Association of British Insurers. Based on the Company's issued share capital, as at 30 June 2017, these were in respect of the limit of 10% in any rolling 10-year period for all plans (4.48%) and in respect of the limit of 5% in any rolling 10-year period for discretionary share plans (4.04%).

The Company was given authority to purchase up to 15% of its existing ordinary share capital at the 2016 AGM. That authority will expire at the conclusion of the AGM in 2017 unless renewed. Accordingly, a special resolution to renew the authority will be proposed at the forthcoming AGM.

The existing authority for Directors to allot ordinary shares will expire at the conclusion of the 2017 AGM. Accordingly, an ordinary resolution to renew this authority will be proposed at the forthcoming AGM. In addition, it will be proposed to give the Directors further authority for a period of one year to allot ordinary shares in connection with a rights issue in favour of ordinary shareholders. This is in accordance with guidance issued by the Association of British Insurers. If the Directors were to use further authority in the year following the 2017 AGM, all Directors wishing to remain in office would stand for re-election at the 2018 AGM.

Details of these resolutions are included with the Notice of AGM enclosed with this report.

## Resolutions at the Annual General Meeting

The Company's AGM will be held on 8 November 2017. Accompanying this report is the Notice of AGM which sets out the resolutions to be considered and approved at the meeting together with some explanatory notes. The resolutions cover such routine matters as the renewal of authority to allot shares, to disapply pre-emption rights and to purchase own shares.

## Substantial shareholdings

The Company has been notified, as at 28 August 2017, of the following material interests in the voting rights of the Company under the provisions of the Disclosure and Transparency Rules.

Shareholders	Number of shares	% of issued share capital
Standard Life Aberdeen plc	4,829,017	9.08
Royal London Asset Management	3,836,284	7.22
JP Morgan Asset Management	3,581,976	6.74
Aviva Investors	3,003,502	5.65
Hargreave Hale	2,946,829	5.54
Schroder Investment Management	2,352,917	4.43
NN Investment Partners BV	2,098,665	3.95
Invesco Asset Management	2,029,461	3.82
Baillie Gifford & Co Limited	1,805,173	3.40
BlackRock Investment Management (UK)	1,615,375	3.04

### Donations

During the year the Group made various charitable donations which are summarised in the Corporate Responsibility and Sustainability Report on page 37. The Group made no political donations during the year to 30 June 2017.

### Independent auditors

A resolution to re-appoint PricewaterhouseCoopers LLP as independent auditors of the Group and Company will be proposed at the AGM.

### Going concern

Having assessed the principal risks and the other matters discussed in connection with the Viability Statement on page 41, the Directors considered it appropriate to adopt the going concern basis of accounting in preparing the financial statements.

### Branches outside the UK

The Group has overseas branches in France, Saudi Arabia, United Arab Emirates, Malaysia, Taiwan and South Korea.

### Additional information

Certain information that is required to be included in the Directors' Report can be found elsewhere in this document as referred to below, each of which is incorporated into the Directors' Report by cross-reference:

- An indication of the likely future developments in the Group's business can found in the Strategic Report, on pages 7, 10, 21 and 23;
- Information on greenhouse gas emissions can be found on pages 34 and 35;
- The Group's statement on corporate governance can be found in the Corporate Governance Statement on pages 72 to 81; and
- The Group's financial risk management objectives and policies in relation to its use of financial instruments and its exposure to capital, liquidity, credit and market risk, to the extent they are material, are set out in Note 24 to the financial statements on pages 143 to 145.

The Directors' Report was approved by order of the Board on 13 September 2017 and signed on its behalf by:



**Patricia Ryan**

Group General Counsel and Company Secretary

# Statement of Directors' responsibilities in respect of the financial statements

The Directors are responsible for preparing the Annual Report, the Directors' Remuneration Report and the financial statements in accordance with applicable law and regulations.

Company law requires the Directors to prepare financial statements for each financial year. Under that law the Directors have prepared the Group and Parent Company financial statements in accordance with International Financial Reporting Standards ('IFRSs') as adopted by the European Union. Under company law the Directors must not approve the financial statements unless they are satisfied that they give a true and fair view of the state of affairs of the Group and Parent Company and of the profit or loss of the Group and Parent Company for that period. In preparing the financial statements, the Directors are required to:

- select suitable accounting policies and then apply them consistently;
- state whether applicable IFRSs as adopted by the European Union have been followed for the Group and Parent Company financial statements, subject to any material departures disclosed and explained in the financial statements;
- make judgements and accounting estimates that are reasonable and prudent; and
- prepare the financial statements on the going concern basis unless it is inappropriate to presume that the Group and Parent Company will continue in business.

The Directors are responsible for keeping adequate accounting records that are sufficient to show and explain the Group and Parent Company's transactions and disclose with reasonable accuracy at any time the financial position of the Group and Parent Company and enable them to ensure that the financial statements and the Directors' Remuneration Report comply with the Companies Act 2006 and, as regards the Group financial statements, Article 4 of the IAS Regulation.

The Directors are also responsible for safeguarding the assets of the Group and Parent Company and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities.



**Dave Shemmans**  
(Chief Executive Officer)

13 September 2017

The Directors are responsible for the maintenance and integrity of the Parent Company's website. Legislation in the United Kingdom governing the preparation and dissemination of financial statements may differ from legislation in other jurisdictions.

The Directors consider that the Annual Report and financial statements, taken as a whole, is fair, balanced and understandable and provides the information necessary for shareholders to assess the Group and Parent Company's performance, business model and strategy.

## Responsibility statement of the Directors in respect of the Annual Report

Each of the Directors, whose names and functions are listed in the Board of Directors section of the Annual Report on pages 70 and 71, confirm that, to the best of their knowledge:

- the Group and Parent Company financial statements, which have been prepared in accordance with IFRSs as adopted by the European Union, give a true and fair view of the assets, liabilities, financial position and profit of the Group and Parent Company; and
- the Strategic Report includes a fair review of the development and performance of the business and the position of the Group and Parent Company, together with a description of the principal risks and uncertainties that it faces.

## Disclosure of information to the auditors

In accordance with Section 418 of the Companies Act 2006, each Director in office at the date of approval of the Directors' Report confirms that:

- so far as the Director is aware, there is no relevant audit information of which the Group and Parent Company's auditors are unaware; and
- they have taken all the steps that they ought to have taken as a Director in order to make themselves aware of any relevant audit information and to establish that the Group and Parent Company's auditors are aware of that information.



**Ian Gibson**  
(Chief Financial Officer)



The background is a solid blue color. In the top left corner, there are three concentric circles in shades of yellow and orange. In the bottom left, there are several yellow and orange icons: a speech bubble, a gear, and a bar chart. The text 'Financial statements' is written in white, sans-serif font on the right side. At the bottom left, there is a small white text '110 Ricardo plc Annual Report & Accounts 2017'.

# Financial statements

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# Independent auditors' report to the members of Ricardo plc

## REPORT ON THE AUDIT OF THE FINANCIAL STATEMENTS

### Opinion

In our opinion, Ricardo plc's Group financial statements and Parent Company financial statements (the 'financial statements'):

- give a true and fair view of the state of the Group's and of the Parent Company's affairs as at 30 June 2017 and of the Group's profit and the Group's and the Parent Company's cash flows for the year then ended;
- have been properly prepared in accordance with IFRSs as adopted by the European Union and as applied in accordance with the provisions of the Companies Act 2006; and
- have been prepared in accordance with the requirements of the Companies Act 2006 and, as regards the Group financial statements, Article 4 of the IAS Regulation.

We have audited the financial statements, included within the Annual Report & Accounts (the 'Annual Report'), which comprise: the consolidated and Parent Company statements of financial position, the consolidated income statement and the consolidated statement of comprehensive income, the consolidated and Parent Company statements of changes in equity, and the consolidated and Parent Company statements of cash flows for the year ended 30 June 2017; and the notes to the financial statements, which include a description of the significant accounting policies.

Our opinion is consistent with our reporting to the Audit Committee.

### Basis for opinion

We conducted our audit in accordance with International Standards on Auditing (UK) ('ISAs (UK)') and applicable law. Our responsibilities under ISAs (UK) are further described in the Auditors' responsibilities for the audit of the financial statements section of our report. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

### Independence

We remained independent of the Group in accordance with the ethical requirements that are relevant to our audit of the financial statements in the UK, which includes the FRC's Ethical Standard as applicable to listed public interest entities, and we have fulfilled our other ethical responsibilities in accordance with these requirements.

To the best of our knowledge and belief, we declare that non-audit services prohibited by the FRC's Ethical Standard were not provided to the Group or the Parent Company.

Other than those disclosed in Note 6 to the financial statements, we have provided no non-audit services to the Group or the Parent Company in the period from 1 July 2016 to 30 June 2017.

## Our audit approach

### Overview

- £1,900,000 (2016: £1,570,000) - Group financial statements
- Based on 5% of profit before tax and specific adjusting items.
- £1,805,000 (2016: £1,402,000) - Parent Company financial statements
- Based on 1% of total assets capped at a level below the Group financial statement level.

### Materiality

- We audited the complete financial information at five reporting units (2016: five reporting units), with procedures on specific balances at six further reporting units.
- As a result audit procedures have been conducted at reporting units representing 85% of the Group's profit before tax and specific adjusting items and representing 82% of revenue.

### Audit scope

- Contract accounting in the Technical Consulting business (Group).
- Recoverability of capitalised development costs (Group).
- Taxation (Group).

### Key audit matters

### The scope of our audit

As part of designing our audit, we determined materiality and assessed the risks of material misstatement in the financial statements. In particular, we looked at where the Directors made subjective judgements, for example in respect of significant accounting estimates that involved making assumptions and considering future events that are inherently uncertain. As in all of our audits we also addressed the risk of management override of internal controls, including evaluating whether there was evidence of bias by the Directors that represented a risk of material misstatement due to fraud.

### Key audit matters

Key audit matters are those matters that, in the auditors' professional judgement, were of most significance in the audit of the financial statements of the current period and include the most significant assessed risks of material misstatement (whether or not due to fraud) identified by the auditors, including those which had the greatest effect on: the overall audit strategy; the allocation of resources in the audit; and directing the efforts of the engagement team. These matters, and any comments we make on the results of our procedures thereon, were addressed in the context of our audit of the financial statements as a whole, and in forming our opinion thereon, and we do not provide a separate opinion on these matters. This is not a complete list of all risks identified by our audit.



Key audit matter	How our audit addressed the key audit matter
<p><b>Contract accounting in the Technical Consulting business</b></p> <p><i>Refer to page 78 ('Contract accounting and performance' within the Audit Committee Report), Notes 1(c) and 1(e) and Note 20 to the financial statements for the Directors' disclosures of the related accounting policies, judgements and estimates for further information.</i></p> <p>Contract accounting is used in the Group's Technical Consulting businesses, which contributes the majority of the Group's revenue, at £280.5m (2016: £267.9m). The contracts are inherently complex and may span a number of reporting periods. They therefore require estimates and judgements by management related to the stage that the contract has reached and the costs to complete the work, that could lead to an under or overstatement of revenue and profit, either intentionally or in error.</p> <p>In contract accounting the amounts recorded in the consolidated statement of financial position depend on the relationship between the work done and forecast costs to come, the invoicing schedule agreed with the client and the cash payments received.</p> <p>The consolidated statement of financial position at 30 June 2017 showed amounts recoverable on contracts ('AROC') of £59.0m and payments received in advance of £24.1m in respect of the Technical Consulting business. We carried out procedures on each of these balances in the course of the work as described opposite.</p> <p>AROC represents work done that has not yet been invoiced and we focused on the risk that it, or the receivables for work that had been invoiced prior to the year-end, would not be recoverable in full. We also considered whether payments received in advance were recognised where the related work had not yet been done.</p> <p>In addition, management assesses the contract related AROC and trade receivable balances to ensure sufficient confidence over the likely recoverability of these balances.</p>	<p>We tested the key controls over contract accounting in the Technical Consulting business, including the controls over recording work done, invoicing and cash receipts. We also attended the 'Red CAT4' (high-risk and underperforming contracts) review meetings in January and July 2017 with the Group Chief Financial Officer and the divisional Managing Directors, at which the performance of these contracts was discussed. We were satisfied that a robust process had been undertaken in the contract reviews and that the outcomes were reflected in the year-end positions in the financial statements.</p> <p>We also tested a sample of contracts by meeting with the relevant project managers and engineers to analyse the contracts in detail. These meetings included discussion and evaluation of the key estimates used in the long-term contract accounting calculations such as costs to complete, key project risks, contingencies held and adherence to billing schedules, which were all reconciled to the project records.</p> <p>Where appropriate, we obtained the relevant contracts and other supporting information and validated the data included in the calculations and management's assumptions for costs to complete based on the contractual requirements. We found that management was able to provide reasonable explanations and appropriate supporting evidence for the various judgements taken.</p> <p>Where management have made an assessment of anticipated recovery of overspends and scope increases within the contract accounting, we have considered the appropriateness of this judgement, challenging the evidence provided and reading correspondence with third parties to support the position taken.</p> <p>We discussed significant AROC and debtor positions with management and performed testing to assess the recoverability of these. We were able to confirm that the positions were consistent with the relevant invoicing schedules and payment plans. We also considered recent communications with customers and traced amounts to subsequent cash receipt where possible. No material issues were identified in this testing.</p> <p>We considered the appropriateness and completeness of judgemental contract provisions and obtained and challenged the evidence provided in support of these, which included reading correspondence with third parties. We considered the position taken by management to be appropriate.</p> <p>We also tested manual journals with a material impact on revenue and found that all journals tested relating to contract accounting were properly supported.</p>

Key audit matter	How our audit addressed the key audit matter
<p><b>Recoverability of capitalised development costs</b>  Refer to page 79 ('Capitalisation and carrying value of development costs' within the Audit Committee Report), and Notes 1(c), 1(o) and 14 to the financial statements for the Directors' disclosures of the related accounting policies, judgements and estimates for further information.</p> <p>The Group has continued to focus on research and development activities, targeted on areas that can maximise future benefit. During the year £3.1m of development spend was capitalised in respect of development projects, resulting in a total of £8.4m held on the statement of financial position at 30 June 2017.</p> <p>The capitalised costs must comply with the criteria set out in IAS 38 'Intangible Assets', and, in particular, there is a risk that such projects will not generate sufficient economic benefit in the future to support the current carrying value.</p>	<p>We tested that development costs were capitalised in accordance with the requirements of the accounting framework and were properly attributable to the relevant projects by obtaining supporting documentation such as invoices and time records and checking the nature of each cost incurred.</p> <p>We found that the costs on these projects had been capitalised in accordance with the criteria set out in IAS 38.</p> <p>We obtained project plans for a sample of the larger projects and met with the project directors to understand progress to date, the potential opportunity and management's assessment of the future returns that will be generated. We challenged management on the specific opportunities tested and found that a number of these have started to realise future economic benefit. In other cases, we were able to obtain appropriate evidence and explanations for the future value.</p>
<p><b>Taxation</b>  Refer to page 79 ('Deferred taxation' within the Audit Committee Report), and Notes 1(c), 1(l), 9 and 26 to the financial statements for the Directors' disclosures of the related accounting policies, judgements and estimates for further information.</p> <p>The Group claims significant R&amp;D credits and has potential liabilities for permanent establishment risks and transfer pricing for which it maintains provisions.</p> <p>The German and US entities have £2.4m and £5.9m respectively of recognised deferred tax assets, but the performance of these businesses in the past few years has been variable, leading to doubt over the likely realisation of the assets.</p>	<p>We obtained the tax calculations, including those for R&amp;D credits, and the position papers prepared by management to understand and test the tax charge and deferred tax position for the Group.</p> <p>We considered the processes and procedures undertaken by management to understand their risks arising from permanent establishments and transfer pricing. We formed our own view on these judgements and concluded that the judgements taken by management in establishing provisions for these risks were reasonable.</p> <p>We evaluated the Group's forecasts for the German and US statutory entities and the process by which they were prepared in considering the forecast utilisation of the relevant deferred tax assets.</p> <p>We noted that €1.7m of the German deferred tax asset was written off during the current year, reducing the deferred tax asset to €2.7m. This was due to further contract losses recognised during the year and a forecast reduction in the level of future trading through the German business. We found management's assessment for the remaining recoverability to be reasonable.</p> <p>We noted the US businesses made a loss in the year, however note the recent announcement of the acquisition of Control Point Corporation and the future prospects for the business supporting the forecast utilisation of the deferred tax asset recognised.</p>

### How we tailored the audit scope

We tailored the scope of our audit to ensure that we performed enough work to be able to give an opinion on the financial statements as a whole, taking into account the structure of the Group and the Parent Company, the accounting processes and controls, and the industry in which they operate.

The Group is structured by division, with significant reporting units in the UK and Europe, and further smaller reporting units in locations across the US, Asia and Europe. The Group financial statements are a consolidation of 60 reporting units, comprising the Group's operating businesses and centralised functions.

For each reporting unit, we determined whether we

required an audit of the complete financial information or whether alternative procedures would be sufficient. Our principal measure for these scoping decisions was revenue, as in the Ricardo Group this is a reasonable indicator of the scale of activities of an individual entity. Based on this measure the full scope components were UK Automotive (part of the Automotive EMEA Technical Consulting business) and Performance Products, as each reporting unit made up more than 15% of the Group's revenue.

We included Ricardo Energy & Environment, Ricardo Rail UK and Ricardo Rail Netherlands as full scope for Group reporting given the scale of the operations in these reporting units and

the requirement for UK and Netherlands statutory audits to be performed for these entities. Ricardo Inc. and Ricardo Software in the US are the other more significant trading businesses within the Group. As these have no local statutory requirement, we performed specified procedures for Group reporting and performed risk focused testing over key contracts and the associated balances. In addition, we performed procedures over specific balances in Ricardo plc, Ricardo Investments Limited, Ricardo Deutschland GmbH and Ricardo China, along with higher level risk-focused procedures with respect to the remaining entities and procedures over consolidation entries.

The Group audit team was responsible for all the work carried out in the UK and the specified procedures work over Ricardo Inc. and Ricardo Software in the US. PwC Netherlands performed work over the Ricardo Rail entity in the Netherlands under our instruction. Discussions were held with the PwC Netherlands team at both planning and completion to discuss the scope of their procedures and their findings.

Taken together, our audit work in the UK and the US, along with work performed by PwC Netherlands, addressed 85% of the Group's profit before tax and specific adjusting items and 82% of revenue. This gave us the evidence we needed for our opinion on the Group financial statements as a whole.

## Materiality

The scope of our audit was influenced by our application of materiality. We set certain quantitative thresholds for materiality. These, together with qualitative considerations, helped us to determine the scope of our audit and the nature, timing and extent of our audit procedures on the individual financial statement line items and disclosures and in evaluating the effect of misstatements, both individually and in aggregate on the financial statements as a whole.

Based on our professional judgement, we determined materiality for the financial statements as a whole as follows:

	Group financial statements	Parent Company financial statements
<b>Overall materiality</b>	£1,900,000 (2016: £1,570,000).	£1,805,000 (2016: £1,402,000).
<b>How we determined it</b>	5% of profit before tax and specific adjusting items.	1% of total assets capped at a level below the Group financial statement materiality level.
<b>Rationale for benchmark applied</b>	We chose this because we consider this to be the principal measure used by shareholders to assess the Group's underlying performance.	We chose this because the entity's primary purpose is that of holding company for the Group.

For each component in the scope of our group audit, we allocated a materiality that is less than our overall group materiality. The range of materiality allocated across components was between £1,805,000 and £352,000. Certain components were audited to a local statutory audit materiality that was also less than our overall group materiality.

We agreed with the Audit Committee that we would report to them misstatements identified during our audit above £95,000 (Group audit) (2016: 75,000) and £90,000 (Parent Company audit) (2016: £75,000) as well as misstatements below those amounts that, in our view, warranted reporting for qualitative reasons.

## Going concern

In accordance with ISAs (UK) we report as follows:

Reporting obligation	Outcome
We are required to report if we have anything material to add or draw attention to in respect of the Directors' statement in the financial statements about whether the Directors considered it appropriate to adopt the going concern basis of accounting in preparing the financial statements and the Directors' identification of any material uncertainties to the Group's and the Parent Company's ability to continue as a going concern over a period of at least twelve months from the date of approval of the financial statements.	We have nothing material to add or to draw attention to. However, because not all future events or conditions can be predicted, this statement is not a guarantee as to the Group's and Parent Company's ability to continue as a going concern.
We are required to report if the Directors' statement relating to going concern in accordance with Listing Rule 9.8.6R(3) is materially inconsistent with our knowledge obtained in the audit.	We have nothing to report.



## Reporting on other information

The other information comprises all of the information in the Annual Report & Accounts other than the financial statements and our auditors' report thereon. The Directors are responsible for the other information. Our opinion on the financial statements does not cover the other information and, accordingly, we do not express an audit opinion or, except to the extent otherwise explicitly stated in this report, any form of assurance thereon.

In connection with our audit of the financial statements, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial statements or our knowledge obtained in the audit, or otherwise appears to be materially misstated. If we identify an apparent material inconsistency or material misstatement, we are required to perform procedures to conclude whether there is a material misstatement of the financial statements or a material misstatement of the other information. If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact. We have nothing to report based on these responsibilities.

With respect to the Strategic Report and Directors' Report, we also considered whether the disclosures required by the UK Companies Act 2006 have been included.

Based on the responsibilities described above and our work undertaken in the course of the audit, the Companies Act 2006, (CA06), ISAs (UK) and the Listing Rules of the Financial Conduct Authority (FCA) require us also to report certain opinions and matters as described below (required by ISAs (UK) unless otherwise stated).

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### Strategic Report and Directors' Report

In our opinion, based on the work undertaken in the course of the audit, the information given in the Strategic Report and Directors' Report for the year ended 30 June 2017 is consistent with the financial statements and has been prepared in accordance with applicable legal requirements. (CA06)  
In light of the knowledge and understanding of the Group and Parent Company and their environment obtained in the course of the audit, we did not identify any material misstatements in the Strategic Report and Directors' Report. (CA06)

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### The Directors' assessment of the prospects of the Group and of the principal risks that would threaten the solvency or liquidity of the Group

We have nothing material to add or draw attention to regarding:

- The Directors' confirmation on page 41 of the Annual Report that they have carried out a robust assessment of the principal risks facing the Group, including those that would threaten its business model, future performance, solvency or liquidity.
- The disclosures in the Annual Report that describe those risks and explain how they are being managed or mitigated.
- The Directors' explanation on page 41 of the Annual Report as to how they have assessed the prospects of the Group, over what period they have done so and why they consider that period to be appropriate, and their statement as to whether they have a reasonable expectation that the Group will be able to continue in operation and meet its liabilities as they fall due over the period of their assessment, including any related disclosures drawing attention to any necessary qualifications or assumptions.

We have nothing to report having performed a review of the Directors' statement that they have carried out a robust assessment of the principal risks facing the Group and statement in relation to the longer-term viability of the Group. Our review was substantially less in scope than an audit and only consisted of making inquiries and considering the Directors' process supporting their statements; checking that the statements are in alignment with the relevant provisions of the UK Corporate Governance Code (the 'Code'); and considering whether the statements are consistent with the knowledge and understanding of the Group and Parent Company and their environment obtained in the course of the audit. (Listing Rules)

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### Other Code Provisions

We have nothing to report in respect of our responsibility to report when:

- The statement given by the Directors, on page 109, that they consider the Annual Report taken as a whole to be fair, balanced and understandable, and provides the information necessary for the members to assess the Group's and Parent Company's position and performance, business model and strategy is materially inconsistent with our knowledge of the Group and Parent Company obtained in the course of performing our audit.
  - The section of the Annual Report on page 77 to 81 describing the work of the Audit Committee does not appropriately address matters communicated by us to the Audit Committee.
  - The Directors' statement relating to the Parent Company's compliance with the Code does not properly disclose a departure from a relevant provision of the Code specified, under the Listing Rules, for review by the auditors.
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## Directors' Remuneration

In our opinion, the part of the Directors' Remuneration Report to be audited has been properly prepared in accordance with the Companies Act 2006. (CA06)

## Responsibilities for the financial statements and the audit

### Responsibilities of the Directors for the financial statements

As explained more fully in the Statement of Directors' Responsibilities set out on page 109, the Directors are responsible for the preparation of the financial statements in accordance with the applicable framework and for being satisfied that they give a true and fair view. The Directors are also responsible for such internal control as they determine is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the Directors are responsible for assessing the Group's and the Parent Company's ability to continue as a going concern, disclosing as applicable, matters related to going concern and using the going concern basis of accounting unless the Directors either intend to liquidate the group or the Parent Company or to cease operations, or have no realistic alternative but to do so.

### Auditors' responsibilities for the audit of the financial statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditors' report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with ISAs (UK) will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

A further description of our responsibilities for the audit of the financial statements is located on the FRC's website at: [www.frc.org.uk/auditorsresponsibilities](http://www.frc.org.uk/auditorsresponsibilities). This description forms part of our auditors' report.

### Use of this report

This report, including the opinions, has been prepared for and only for the Parent Company's members as a body in accordance with Chapter 3 of Part 16 of the Companies Act 2006 and for no other purpose. We do not, in giving these opinions, accept or assume responsibility for any other purpose or to any other person to whom this report is shown or into whose hands it may come save where expressly agreed by our prior consent in writing.

## OTHER REQUIRED REPORTING Companies Act 2006 exception reporting

Under the Companies Act 2006 we are required to report to you if, in our opinion:

- we have not received all the information and explanations we require for our audit; or
- adequate accounting records have not been kept by the Parent Company, or returns adequate for our audit have not been received from branches not visited by us; or
- certain disclosures of Directors' remuneration specified by law are not made; or
- the Parent Company financial statements and the part of the Directors' Remuneration Report to be audited are not in agreement with the accounting records and returns.

We have no exceptions to report arising from this responsibility.

### Appointment

Following the recommendation of the audit committee, we were appointed by the members on 24 September 1990 to audit the financial statements for the year ended 30 June 1991 and subsequent financial periods. The period of total uninterrupted engagement is 27 years, covering the years ended 30 June 1991 to 30 June 2017.

**Andrew Paynter (Senior Statutory Auditor)**  
for and on behalf of PricewaterhouseCoopers LLP  
Chartered Accountants and Statutory Auditors  
Gatwick  
**13 September 2017**

# Consolidated income statement

for the year ended 30 June 2017

	Note	Year ended 30 June 2017			Year ended 30 June 2016		
		Underlying £m	Specific adjusting items <sup>(1)</sup> £m	Total £m	Underlying £m	Specific adjusting items <sup>(1)</sup> £m	Total £m
Revenue	2 & 3	352.1	-	352.1	332.4	-	332.4
Cost of sales		(219.2)	-	(219.2)	(202.6)	-	(202.6)
Gross profit		132.9	-	132.9	129.8	-	129.8
Administrative expenses		(92.6)	(6.1)	(98.7)	(90.7)	(6.2)	(96.9)
Other income		0.5	-	0.5	0.5	1.5	2.0
Operating profit	5	40.8	(6.1)	34.7	39.6	(4.7)	34.9
Finance income	8	0.2	-	0.2	0.3	-	0.3
Finance costs	8	(2.7)	-	(2.7)	(2.2)	-	(2.2)
Net finance costs	8	(2.5)	-	(2.5)	(1.9)	-	(1.9)
<b>Profit before taxation</b>		<b>38.3</b>	<b>(6.1)</b>	<b>32.2</b>	<b>37.7</b>	<b>(4.7)</b>	<b>33.0</b>
Taxation	9	(8.8)	1.4	(7.4)	(8.6)	1.2	(7.4)
<b>Profit for the year</b>		<b>29.5</b>	<b>(4.7)</b>	<b>24.8</b>	<b>29.1</b>	<b>(3.5)</b>	<b>25.6</b>
Profit attributable to:							
- Owners of the parent		29.5	(4.7)	24.8	29.1	(3.5)	25.6
- Non-controlling interests	38	-	-	-	-	-	-
		29.5	(4.7)	24.8	29.1	(3.5)	25.6

## Earnings per ordinary share attributable to the owners of the parent during the year

Basic	10	46.8p	48.6p
Diluted	10	46.4p	48.1p

(1) Specific adjusting items comprise amortisation of acquired intangible assets, acquisition-related expenditure and reorganisation costs. In the prior year, non-recurring income for claims under the Research and Development Expenditure Credit ("RDEC") scheme in respect of previous years was also included. Further details are given in Note 4.

The Company has not presented its own Income Statement and Statement of Comprehensive Income as permitted by Section 408 of the Companies Act 2006.

# Consolidated statement of comprehensive income

for the year ended 30 June 2017

	Note	Year ended 30 June 2017 £m	Year ended 30 June 2016 £m
Profit for the year		24.8	25.6
Items that will not be reclassified to profit or loss:			
Remeasurements of the defined benefit scheme	25	(4.4)	(4.4)
Deferred tax on remeasurements of the defined benefit scheme	26	0.8	0.7
Total items that will not be reclassified to profit or loss		(3.6)	(3.7)
Items that may be subsequently reclassified to profit or loss:			
Currency translation on foreign currency net investments	31	3.0	8.7
Total items that may be subsequently reclassified to profit or loss		3.0	8.7
Total other comprehensive (loss)/income for the year (net of tax)		(0.6)	5.0
<b>Total comprehensive income for the year</b>		<b>24.2</b>	<b>30.6</b>
Attributable to:			
- Owners of the parent		24.2	30.6
- Non-controlling interests		-	-
		24.2	30.6



# Consolidated and parent company statements of financial position

as at 30 June 2017

	Note	Group		Company	
		30 June 2017	30 June 2016	30 June 2017	30 June 2016
		£m	£m	£m	£m
<b>Assets</b>					
<b>Non-current assets</b>					
Goodwill	13	62.0	57.0	-	-
Other intangible assets	14	32.4	35.3	2.7	3.8
Property, plant and equipment	15	48.0	53.6	4.7	7.3
Investments	16	-	-	103.1	73.9
Deferred tax assets	26	14.3	13.0	4.8	5.7
		<b>156.7</b>	158.9	<b>115.3</b>	90.7
<b>Current assets</b>					
Inventories	17	13.9	11.0	-	-
Trade and other receivables*	18	137.6	114.3	105.2	92.0
Derivative financial assets	23	0.9	0.4	0.9	0.4
Current tax assets		0.6	1.2	0.4	-
Cash and cash equivalents	34	27.9	23.7	0.9	0.1
		<b>180.9</b>	150.6	<b>107.4</b>	92.5
Non-current assets held for sale	19	2.8	-	-	-
		<b>183.7</b>	150.6	<b>107.4</b>	92.5
<b>Total assets</b>		<b>340.4</b>	309.5	<b>222.7</b>	183.2
<b>Liabilities</b>					
<b>Current liabilities</b>					
Borrowings	22	(6.0)	(3.4)	(6.0)	(3.4)
Trade and other payables	21	(82.1)	(72.5)	(66.7)	(23.5)
Current tax liabilities*		(6.3)	(9.0)	-	(0.2)
Derivative financial liabilities	23	(0.7)	(2.5)	(0.7)	(2.5)
Provisions	27	(1.3)	(1.3)	-	-
		<b>(96.4)</b>	(88.7)	<b>(73.4)</b>	(29.6)
<b>Net current assets</b>		<b>87.3</b>	61.9	<b>34.0</b>	62.9
<b>Non-current liabilities</b>					
Borrowings	22	(59.8)	(54.7)	(19.8)	(14.7)
Retirement benefit obligations	25	(22.2)	(21.5)	(22.2)	(21.5)
Deferred tax liabilities	26	(5.0)	(3.6)	(0.1)	(0.5)
Provisions	27	(1.3)	(1.5)	-	-
		<b>(88.3)</b>	(81.3)	<b>(42.1)</b>	(36.7)
<b>Total liabilities</b>		<b>(184.7)</b>	(170.0)	<b>(115.5)</b>	(66.3)
<b>Net assets</b>		<b>155.7</b>	139.5	<b>107.2</b>	116.9
<b>Equity</b>					
<b>Equity attributable to owners of the parent</b>					
Share capital	28	13.3	13.2	13.3	13.2
Share premium	29	14.3	14.3	14.3	14.3
Other reserves	31	15.6	12.6	-	-
Retained earnings	32				
At 1 July		<b>99.4</b>	84.7	<b>89.4</b>	81.7
Profit for the year attributable to the owners		<b>24.8</b>	25.6	<b>1.9</b>	18.6
Other changes in retained earnings		<b>(12.0)</b>	(10.9)	<b>(11.7)</b>	(10.9)
		<b>112.2</b>	99.4	<b>79.6</b>	89.4
Non-controlling interests	38	0.3	-	-	-
<b>Total equity</b>		<b>155.7</b>	139.5	<b>107.2</b>	116.9

(\*) As set out in more detail in Note 1(l), the prior year classification of the Group's current assets and liabilities in respect of claims under the Research & Development Expenditure Credit ("RDEC") scheme have been restated.

The notes on pages 122 to 157 form an integral part of these financial statements.

The financial statements of Ricardo plc (registered number 222915) on pages 118 to 157 were approved by the Board of Directors on 13 September 2017 and signed on its behalf by:

  
**Dave Shemmans**  
 (Chief Executive Officer)

  
**Ian Gibson**  
 (Chief Financial Officer)

# Consolidated and parent company statements of changes in equity

for the year ended 30 June 2017

Group	Note	Attributable to owners of the parent					Non-controlling interest	Total equity
		Share capital	Share premium	Other reserves	Retained earnings	Total		
		£m	£m	£m	£m	£m	£m	£m
At 1 July 2016		13.2	14.3	12.6	99.4	139.5	-	139.5
Profit for the year		-	-	-	24.8	24.8	-	24.8
Other comprehensive income/(loss) for the year		-	-	3.0	(3.6)	(0.6)	-	(0.6)
Total comprehensive income for the year		-	-	3.0	21.2	24.2	-	24.2
Reclassification of non-controlling interests	32	-	-	-	(0.3)	(0.3)	0.3	-
Equity-settled transactions	30	-	-	-	1.6	1.6	-	1.6
Tax credit relating to share option schemes	32	-	-	-	0.1	0.1	-	0.1
Proceeds from shares issued	28 & 29	0.1	-	-	-	0.1	-	0.1
Ordinary share dividends	11	-	-	-	(9.8)	(9.8)	-	(9.8)
<b>At 30 June 2017</b>		<b>13.3</b>	<b>14.3</b>	<b>15.6</b>	<b>112.2</b>	<b>155.4</b>	<b>0.3</b>	<b>155.7</b>
At 1 July 2015		13.1	14.3	3.9	84.7	116.0	-	116.0
Profit for the year		-	-	-	25.6	25.6	-	25.6
Other comprehensive income/(loss) for the year		-	-	8.7	(3.7)	5.0	-	5.0
Total comprehensive income for the year		-	-	8.7	21.9	30.6	-	30.6
Equity-settled transactions	30	-	-	-	1.5	1.5	-	1.5
Tax credit relating to share option schemes	32	-	-	-	0.2	0.2	-	0.2
Proceeds from shares issued	28 & 29	0.1	-	-	-	0.1	-	0.1
Ordinary share dividends	11	-	-	-	(8.9)	(8.9)	-	(8.9)
At 30 June 2016		13.2	14.3	12.6	99.4	139.5	-	139.5

Company	Note	Attributable to owners of the parent					Non-controlling interest	Total equity
		Share capital	Share premium	Other reserves	Retained earnings	Total		
		£m	£m	£m	£m	£m	£m	£m
At 1 July 2016		13.2	14.3	-	89.4	116.9	-	116.9
Profit for the year		-	-	-	1.9	1.9	-	1.9
Other comprehensive loss for the year		-	-	-	(3.6)	(3.6)	-	(3.6)
Total comprehensive loss for the year		-	-	-	(1.7)	(1.7)	-	(1.7)
Equity-settled transactions	30	-	-	-	1.6	1.6	-	1.6
Tax credit relating to share option schemes	32	-	-	-	0.1	0.1	-	0.1
Proceeds from shares issued	28 & 29	0.1	-	-	-	0.1	-	0.1
Ordinary share dividends	11	-	-	-	(9.8)	(9.8)	-	(9.8)
<b>At 30 June 2017</b>		<b>13.3</b>	<b>14.3</b>	<b>-</b>	<b>79.6</b>	<b>107.2</b>	<b>-</b>	<b>107.2</b>
At 1 July 2015		13.1	14.3	-	81.7	109.1	-	109.1
Profit for the year		-	-	-	18.6	18.6	-	18.6
Other comprehensive loss for the year		-	-	-	(3.7)	(3.7)	-	(3.7)
Total comprehensive income for the year		-	-	-	14.9	14.9	-	14.9
Equity-settled transactions	30	-	-	-	1.5	1.5	-	1.5
Tax credit relating to share option schemes	32	-	-	-	0.2	0.2	-	0.2
Proceeds from shares issued	28 & 29	0.1	-	-	-	0.1	-	0.1
Ordinary share dividends	11	-	-	-	(8.9)	(8.9)	-	(8.9)
At 30 June 2016		13.2	14.3	-	89.4	116.9	-	116.9

# Consolidated and parent company statements of cash flow

for the year ended 30 June 2017

	Note	Group		Company	
		Year ended 30 June 2017	Year ended 30 June 2016	Year ended 30 June 2017	Year ended 30 June 2016
		£m	£m	£m	£m
<b>Cash flows from operating activities</b>					
Cash generated from/(used in) operations*	33	24.3	29.0	(1.7)	(23.1)
Net finance (costs)/income		(1.4)	(1.1)	0.7	1.1
Tax paid*		(7.6)	(4.5)	-	(0.1)
Net cash generated from/(used in) operating activities		15.3	23.4	(1.0)	(22.1)
<b>Cash flows from investing activities</b>					
Acquisitions of subsidiaries, net of cash acquired	12	(1.9)	(45.4)	-	-
Purchases of property, plant and equipment		(6.3)	(8.5)	-	(0.2)
Proceeds from sale of property, plant and equipment		4.0	-	4.0	-
Purchases of intangible assets		(5.6)	(6.2)	(0.2)	(0.5)
Dividends received from subsidiaries		-	-	-	18.5
Net cash (used in)/generated from investing activities		(9.8)	(60.1)	3.8	17.8
<b>Cash flows from financing activities</b>					
Proceeds from issuance of ordinary shares		0.1	0.1	0.1	0.1
Net proceeds from borrowings		5.1	9.4	5.1	9.4
Dividends paid to shareholders	11	(9.8)	(8.9)	(9.8)	(8.9)
Net cash (used in)/generated from financing activities		(4.6)	0.6	(4.6)	0.6
Effect of exchange rate changes on cash and cash equivalents		0.7	(3.2)	-	-
<b>Net increase/(decrease) in cash and cash equivalents</b>	34	1.6	(39.3)	(1.8)	(3.7)
Cash and cash equivalents at 1 July	34	20.4	59.7	(3.2)	0.5
<b>Net cash and cash equivalents at 30 June</b>	34	22.0	20.4	(5.0)	(3.2)
<b>At 1 July</b>					
Cash and cash equivalents		23.7	59.7	0.1	0.5
Bank overdrafts		(3.3)	-	(3.3)	-
		20.4	59.7	(3.2)	0.5
<b>At 30 June</b>					
Cash and cash equivalents		27.9	23.7	0.9	0.1
Bank overdrafts		(5.9)	(3.3)	(5.9)	(3.3)
<b>Net cash and cash equivalents at 30 June</b>		22.0	20.4	(5.0)	(3.2)

(\*) As set out in more detail in Note 1(l), the prior year classification of items within the Group's cash generated from operating activities in respect of claims under the Research & Development Expenditure Credit ('RDEC') scheme have been restated.



# Notes to the financial statements

## 1 Accounting policies

Ricardo plc (the 'Company') and its subsidiaries (together, the 'Group') provide engineering, technical, environmental, and strategic consultancy services. The Group also manufactures and assembles niche, high-quality and high-performance products. The Group sells its products and services to customers in the UK, the rest of Europe, Asia and North America.

Ricardo plc is a public limited company, which is listed on the London Stock Exchange and incorporated and domiciled in the United Kingdom. The address of its registered office is Shoreham Technical Centre, Shoreham-by-Sea, West Sussex, BN43 5FG, England, United Kingdom.

The principal accounting policies applied in the preparation of these financial statements are set out below. These policies have been consistently applied to the years ended 30 June 2016 and 30 June 2017.

### (a) Basis of preparation

These financial statements of Ricardo plc have been prepared in accordance with International Financial Reporting Standards ('IFRS'), IFRS Interpretations Committee ('IFRS IC') interpretations adopted by the European Union ('EU') and the Companies Act 2006 applicable to companies reporting under IFRS.

The financial statements have been prepared on a going concern basis under the historical cost convention, as modified by financial assets and financial liabilities (including derivative instruments) which are measured at fair value through profit or loss.

Having assessed the principal risks and the other matters discussed in connection with the Viability Statement on page 41, the Directors considered it appropriate to adopt the going concern basis of accounting in preparing the financial statements.

The preparation of financial statements in conformity with IFRS requires the use of certain critical accounting estimates. It also requires management to exercise its judgement in the process of applying the Group's accounting policies. The areas involving a higher degree of judgement or complexity, or areas where assumptions and estimates are significant to the financial statements are disclosed in Note 1(c).

#### *Changes in accounting policies*

There are no new, revised or amended standards and interpretations which are mandatory for the first time for the financial year ended 30 June 2017. New, revised or amended standards and interpretations that are not yet effective have not been early adopted and are disclosed in Note 1(x).

### (b) Basis of consolidation

The consolidated financial statements comprise the financial statements of the Company and all of its subsidiaries (together the 'Group') prepared to the end of the financial year. Subsidiaries are all entities (including structured entities) over which the Group has control. The Group controls an entity when the Group is exposed to, or has rights to, variable returns from its involvement with the entity and has the ability to affect those returns through its power over the entity. Subsidiaries are fully consolidated from the date on which control is transferred to the Group and are deconsolidated from the date that control ceases. Intercompany transactions and balances are eliminated on consolidation.

The Group applies the acquisition method of accounting to account for business combinations. The consideration transferred for an acquisition is the fair value of the assets acquired and the liabilities assumed. The consideration transferred includes the fair value of any asset or liability resulting from a contingent consideration arrangement. Identifiable assets acquired and liabilities and contingent liabilities assumed in a business combination

are measured initially at their fair values at the acquisition date. Acquisition-related expenditure is expensed as incurred.

### (c) Management judgements and key accounting estimates

In preparing the financial statements, the Group is required to exercise judgement in making estimates and assumptions that affect reported amounts and disclosures. These judgements are continually evaluated and are based on historical experience and other factors, including expectations of future events that are believed to be reasonable under the circumstances. Actual results could differ from those estimates and assumptions. The following accounting policies have been identified as being particularly sensitive to complex or subjective judgements or estimates:

#### *Performance and revenue recognition for fixed price contracts*

The Group derives a significant proportion of its revenue from the supply of professional services under contracts, most of which are normally fixed price contracts that may extend for a significant period of time. Where the outcome can be estimated reliably, contract revenue is recognised to the extent that the services have been performed. Performance is measured based on costs incurred to date as a percentage of total expected costs. Management judgement and experience is required to determine the completeness of those forecasts, the recoverability of the costs incurred and the revenue recognised on contracts. Unforeseen future events may adversely impact the accuracy of those forecasts and recoverability judgements. Further details are given in Note 20.

#### *Retirement benefit obligations*

The Group operates a defined benefit pension scheme that provides benefits to a number of current and former employees. This scheme is closed to new entrants and the accrual of future benefits for active members ceased at the end of February 2010. The value of the deficit is particularly sensitive to the market value of the scheme's assets, discount rates and actuarial assumptions related to mortality.

From June 2016, the Company and Trustees decided to introduce a 'retirement flexibility' option to the Fund, which allows members to transfer out their benefits at retirement. No allowance continues to have been made within the defined benefit obligation as at 30 June 2017 for members who may elect to transfer out their benefits at retirement. This assumption will be reviewed on an ongoing basis and may change in future as experience emerges as to the level of members who elect to transfer out their benefits at retirement. Further details are given in Note 25.

#### *Current and deferred taxation*

Legislation related to taxation is complex and its impact on the Group may be uncertain. In preparing the Group's financial statements management estimates its taxation, having taken appropriate professional advice. Determination of an agreed amount of taxation payable may take several years, and the final amount paid may differ from the liabilities recorded in these financial statements.

The recognition of assets and liabilities related to deferred taxation also requires management to exercise judgement, in particular the extent to which assets should be recognised. Further details are given in Note 26.

#### *Development costs*

Certain directly attributable costs which are incurred in the development of an intangible asset are capitalised. These costs are recognised as an asset once the Group has determined that the attributable expenditure can be measured reliably, that it has the intention and the necessary resources to complete the relevant project and that it is considered probable that the resulting asset

## 1 Accounting policies (continued)

### (c) Management judgements and key accounting estimates (continued)

will generate future economic benefits for the Group. Determining whether it is probable that the resulting asset will generate sufficient economic benefits in the future requires management judgement. Further details are given in Note 14.

#### *Provisions*

A provision is required when the Group has a present legal or constructive obligation at the reporting date as a result of a past event, and it is probable that settlement will be required of an amount that can be reliably estimated. Provisions for warranty costs are recognised at the date of sale of the relevant products, at management's best estimate of the expenditure required to settle the Group's liability. These estimates are reviewed each year and updated as necessary. Further details are given in Note 27.

### (d) Segmental reporting

Operating segments are reported in a manner consistent with the discrete financial information that is internally reported and provided to the Chief Operating Decision Maker, who is responsible for allocating resources and assessing performance of the operating segments.

### (e) Revenue

The Group principally earns revenue through the supply of professional services and products to customers. Revenue is stated net of value added and other sales taxes.

#### *Technical Consulting*

The majority of the Group's revenue is earned from Technical Consulting contracts for professional services.

Technical Consulting contracts are typically awarded on a fixed price basis. Where the outcome can be estimated reliably, contract revenue is recognised to the extent that the services have been performed. Performance is measured based on costs incurred to date as a percentage of total expected costs.

Profit is not recognised on a contract, and revenue is not recognised in excess of recoverable costs, unless its outcome can be estimated reliably. It is deemed possible to reliably estimate the outcome of a contract when the Group is in possession of documentation from a customer that is on terms and conditions acceptable to the Group and, subject to the successful execution of the contract, can be invoiced against and paid for. A loss on a fixed price contract is recognised immediately when it becomes probable that the contract cost will exceed the total contract revenue. Monthly reviews of contracts by local management, in conjunction with reviews by senior management of contracts deemed to be of higher risk, ensure that the Group identifies and recognises expected losses on fixed price contracts immediately.

Revenue from contract variations closely linked to underlying fixed price contracts is recognised based on performance under the contract as a whole, but only to the extent that it can be reliably measured and it is probable that the customer will approve both the variation and the amount of additional revenue. Contract variations not closely linked to underlying fixed price contracts are treated as separate contracts. Groups of separate legal contracts or supplementary contracts received in addition to pre-existing contracts are combined and accounted for as a single contract to the extent that they are negotiated as a single package, performed concurrently or in a continuous sequence and are so closely interrelated that they are, in substance, part of a single project with an overall profit margin.

Assets arising from the recognition of revenue are recorded in trade and other receivables, initially as amounts recoverable on contracts and transferred to trade receivables when invoiced. Amounts received from customers for services not yet recognised as revenue are initially classified as payments received in advance on contracts within trade and other payables.

Certain contracts may be awarded on a time and materials basis. For these contracts, revenue recognition is based on the expected sales value of the time worked and costs incurred to date.

Other contracts relate to the supply of annual subscription services, for which revenue from renewals is recognised on a straight-line basis over the period of subscription. Where significant administrative effort is required for new and upgrading customers to set up the services to be provided, revenue is recognised based on the fair value of the initial work performed. The remainder is recognised on a straight-line basis over the period of subscription.

#### *Performance Products*

Within Performance Products, Group revenue is principally derived from the sale of high-performance products produced from assembly operations.

Revenue from the sale of goods is measured at the fair value of the consideration and is recognised when the Group has transferred the significant risks and rewards of ownership of the goods to the buyer, when the amount of revenue can be measured reliably and when it is probable that the economic benefits associated with the transaction will flow to the Group. This is typically on delivery of goods to the customer.

Bill-and-hold sales occur where all performance obligations have been satisfied but the customer requests that the goods are held by the Group until such times as delivery or collection of the goods is required by the customer. Revenue is recognised and billed under usual payment terms when the customer formally agrees to accept the risks of legal title and specifically acknowledges their deferred delivery instructions, provided that the goods have been identified, set aside and made available for delivery to the customer at the time the sale is recognised and it is considered probable that delivery will be made.

Performance Products also includes revenues derived from the sale of software licences. The Group's software products are standard version controlled products available for general sale. Normally there are no substantive obligations to fulfil following sale and revenue is recognised on delivery. Revenue derived from the supply of software-related services is recognised on a straight-line basis over the period during which the service is supplied.

### (f) Research and development expenditure

Research and development expenditure is recognised as an expense in the Consolidated Income Statement in the period in which it is incurred as disclosed in Note 5, other than where the activity is performed for customers, in which case it is included within the contract accounting, or when development expenditure meets the criteria for recognition as an intangible asset as described in Note 1(o), and includes all directly attributable costs.

## 1 Accounting policies (continued)

### (g) Government grants

The Group receives income-related grants from various national and supranational government agencies, principally for credits in respect of qualifying research and development expenditure, together with funding of research and development and capital projects. A grant is not recognised in the Consolidated Income Statement until there is reasonable assurance that the Group will comply with its conditions and that the grant will be received. Grants are presented in the Consolidated Income Statement as a deduction from the related expenses. Grants contributing to the cost of an asset are deducted from the asset's cost and reflected in the depreciation throughout the useful life of the asset.

Grants are not normally received until after qualification conditions have been met and the related expenditure has been incurred. Where this is not the case, they are recorded within trade and other payables either as a payment received in advance on contracts or as accruals and deferred income.

### (h) Retirement benefit costs

The Group operates one defined benefit and several defined contribution retirement benefit schemes. The defined retirement benefit scheme is closed to new entrants and the accrual of future benefits for active members ceased at the end of February 2010. Payments to defined contribution schemes are charged as an expense as they fall due. Differences between contributions payable in the year and contributions actually paid are shown as either accruals or prepayments in the Statement of Financial Position. Payments to state-managed schemes are dealt with as payments to defined contribution schemes as the Group's obligations under the schemes are similar in nature.

For the defined benefit retirement scheme, the cost of providing benefits is determined using the projected unit credit method, with actuarial valuations being carried out at each reporting date. Remeasurements are recognised in the Consolidated Statement of Comprehensive Income except where they result from settlements or curtailments, in which case they are reported in the Consolidated Income Statement.

Past service cost is recognised immediately to the extent that the benefits are already vested, and otherwise is amortised on a straight-line basis over the average period until the benefits become vested. The retirement benefit obligations recognised in the Statement of Financial Position represent the present value of the defined benefit obligations as adjusted for unrecognised past service cost, and as reduced by the fair value of scheme assets. Any asset resulting from this calculation is limited to past service cost, plus the present value of available refunds and reductions in future contributions to the plan.

The net of the expected return on the scheme's assets and the increase during the year in the present value of the scheme's liabilities arising from the passage of time are included in finance costs.

### (i) Share-based payments

Equity-settled share-based payments are measured at fair value at the date of grant. The fair value determined at the grant date is expensed on a straight-line basis over the vesting period. The amount expensed is adjusted over the vesting period for changes in the estimate of the number of shares that will eventually vest, save for changes resulting from any market-related performance conditions.

Cash-settled share-based payments are measured at fair value at the date of grant and expensed over the vesting period until the vesting date with the recognition of a corresponding liability. The liability is remeasured to fair value at each reporting date up to and including the settlement date, with changes in fair value recognised in the Consolidated Income Statement for the year. The amount expensed is adjusted over the vesting period for changes in the estimate of the number of shares that will eventually vest.

Fair value is measured by using the Monte Carlo and Black Scholes models as explained in Note 30. The expected life used in the models are adjusted for the effects of exercise restrictions and behavioural considerations.

### (j) Leases

The costs of operating leases and amortisation of operating lease incentives are charged to the Consolidated Income Statement on a straight-line basis over the period of the lease.

### (k) Foreign currency

#### Transactions

The functional currency of the Company and the presentation currency of the Group is Pounds Sterling. The functional currency of each subsidiary is the currency of the primary economic environment in which the entity operates. Transactions in currencies other than the functional currency are recorded at prevailing exchange rates. At each reporting date, monetary assets and liabilities denominated in foreign currencies are retranslated at the rates prevailing on the reporting date. Non-monetary assets and liabilities denominated in foreign currencies are translated at the rates prevailing at the date when the transaction occurred. Gains and losses arising on retranslation and settlements are included in the Consolidated Income Statement for the year.

#### Consolidation

On consolidation, the assets and liabilities of foreign operations, including goodwill and fair value adjustments are translated into the presentation currency at exchange rates prevailing on the reporting date. Income and expense items are translated at the average exchange rates of the year unless exchange rates fluctuate significantly. All resulting exchange differences are recognised in the Consolidated Statement of Comprehensive Income. Exchange differences arising from 1 July 2004, the date of transition to IFRS, are classified as equity and recognised in the translation reserve. Exchange differences arising before that date are not separately reported. On disposal of an operation, or part thereof, the related cumulative translation differences are recognised in the Consolidated Income Statement as a component of the gain or loss arising on disposal.

### (l) Taxation

The tax expense for the year comprises current and deferred tax. Tax is recognised in the Consolidated Income Statement, except to the extent that it relates to items recognised in the Consolidated Statement of Comprehensive Income or directly in equity. In this case, the tax is also recognised in the Consolidated Statement of Comprehensive Income or directly in equity, respectively.

The current tax charge is the expected tax payable on taxable income for the year, calculated using the average rate applicable for the year on the basis of the tax laws enacted or substantively enacted at the reporting date in the countries where the Group operates and generates taxable income. The current tax charge also includes any adjustment to tax payable in respect of previous years. Management periodically evaluates positions taken in tax returns with respect to situations in which applicable tax regulation is subject to interpretation and is therefore inherently uncertain. It establishes provisions where appropriate on the basis of amounts expected to be paid to the relevant tax authorities.

On 2 July 2013, legislation was enacted to allow UK companies to elect for the Research and Development Expenditure Credit ('RDEC') on qualifying expenditure incurred since 1 April 2013, instead of the 'super-deduction' rules, which were abolished from 1 April 2016. Management elected to adopt the RDEC regime as of 1 July 2015,



## 1 Accounting policies (continued)

### (l) Taxation (continued)

which also permitted claims to be made on qualifying expenditure under RDEC in excess of the tax relief received under the legacy scheme since 1 July 2013. Credits relating to the current year are included within underlying profit before tax, offset against research and development expenditure incurred. The credit in the prior year related to claims made for the excess in RDEC over the tax relief received under the legacy scheme in the two years between enactment and adoption. The credit was recorded as other income and classified as a specific adjusting item on the basis that it was non-recurring and there was no corresponding expenditure against which these credits could be offset.

RDEC claims receivable at the reporting date have been reclassified as trade and other receivables in both years presented within the Consolidated Statement of Financial Position and the Consolidated Statement of Cash Flow, together with the related notes. RDEC claims receivable of £5.4m for the year ended 30 June 2016 were previously classified as a reduction in net current tax liabilities within the Consolidated Statement of Financial Position. RDEC claims received of £1.5m for the year ended 30 June 2016 were previously classified as a reduction in tax paid within the Consolidated Statement of Cash Flow. RDEC claims have been represented on this basis as they are settled separately from the Group's current tax liabilities.

Deferred tax is recognised on temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for taxation purposes. However, deferred tax liabilities are not recognised if they arise from the initial recognition of goodwill; deferred tax is not accounted for if it arises from the initial recognition of an asset or liability in a transaction other than a business combination that at the time of the transaction affects neither accounting nor taxable profit and differences relating to investments in subsidiaries to the extent that it is not probable that they will reverse in the foreseeable future. The amount of deferred tax provided is based on the expected manner of realisation or settlement of the carrying amount of assets and liabilities, using tax rates enacted or substantively enacted at the reporting date.

Deferred tax assets are recognised only to the extent that it is probable that taxable profits will be available in the foreseeable future against which the asset can be utilised. Deferred tax assets are reduced to the extent that it is no longer probable that the related tax benefit will be realised within the foreseeable future.

### (m) Dividends

Dividends are recognised as a liability in the year in which they are fully authorised. Interim dividends are recognised when paid.

### (n) Goodwill

Goodwill arises on the acquisition of subsidiaries and represents the excess of the consideration transferred over the fair value of the identifiable assets acquired and liabilities assumed. As permitted by IFRS, goodwill arising on acquisitions prior to the date of transition to IFRS of 1 July 2004 has not been restated, but is retranslated using exchange rates prevailing at each reporting date.

Goodwill is recognised as an asset and is carried at cost less accumulated impairment losses. It is not subject to amortisation, but is reviewed for impairment annually, or more frequently if events or changes in circumstances indicate a potential impairment. For the purpose of impairment testing, goodwill acquired in a business combination is allocated to each of the cash-generating units ('CGUs'), or groups of CGUs, that is expected to benefit from that business combination. Each CGU or group of CGUs to which goodwill is allocated represents the lowest level at which goodwill is monitored for internal management purposes.

The Group's impairment review compares the carrying value of the

goodwill to the recoverable amount of the CGU to which the goodwill has been allocated. The recoverable amount is the higher of the value in use or the fair value less costs of disposal. Estimating the value in use requires the Directors to perform an assessment of the discounted future cash flows that the CGU is able to generate. An impairment is deemed to have occurred where the recoverable amount of a CGU is less than the carrying value of the allocated goodwill. Any impairment is recognised immediately in the Consolidated Income Statement and is not subsequently reversed. On disposal of an operation, the attributable amount of goodwill is included in the determination of the gain or loss on disposal.

### (o) Other intangible assets

#### *Acquisition-related intangible assets*

Acquisition-related intangible assets that are either separable or arising from contractual rights are recognised at fair value at the date of acquisition, and subsequently at amortised cost. Such intangible assets include customer contracts and relationships, trademarks, technology and acquired software. The fair value of acquired intangible assets is determined by use of appropriate valuation techniques, including the excess earnings and royalty relief method.

#### *Software*

Purchased software is capitalised on the basis of the purchase price plus any external and internal costs directly attributable to bring the specific software to the condition necessary for it to be capable of operating in the manner intended.

#### *Development costs*

Certain directly attributable costs which are incurred in the development of certain products are capitalised. These costs are recognised as an asset once the Group has determined that it has the intention and the necessary resources to complete the relevant project, it is probable that the resulting asset will generate economic benefits for the Group and the attributable expenditure can be measured reliably. Development costs are capitalised where these criteria have been met and amortised over their finite useful lives.

#### *Amortisation*

Amortisation is calculated using the straight-line method to allocate the cost of intangible assets over their estimated useful lives, as follows:

- Acquisition-related intangible assets	Between 3 and 8 years
- Software	Between 2 and 10 years
- Development costs	Between 2 and 5 years

### (p) Property, plant and equipment

Property, plant and equipment is stated at historical cost less depreciation. The gross cost of an item of property, plant and equipment is the purchase price and any costs directly attributable to bringing the asset to the location and condition necessary for it to be capable of operating in the manner intended. Grants contributing to the cost of an asset are deducted from the asset's cost and reflected in the depreciation throughout the useful life of the asset.

Depreciation is calculated using the straight-line method to allocate their cost to their residual values over their estimated useful lives, as follows:

- Freehold land	Not depreciated
- Freehold buildings including fixed plant	Between 25 and 50 years
- Leasehold property including fixed plant	Over the term of the lease
- Plant and machinery	Between 4 and 10 years
- Fixtures, fittings and equipment	Between 2 and 10 years

## 1 Accounting policies (continued)

### (p) Property, plant and equipment (continued)

The assets' residual values and useful lives are reviewed, and adjusted if appropriate, at the end of each reporting period.

Assets under construction are carried at cost, less any impairment in value, and are included in the relevant asset category. Depreciation of these assets commences when they are available for their intended use.

### (q) Non-current assets held for sale

Non-current assets are classified as held for sale when their carrying amount is to be recovered principally through a sale transaction, rather than through continuing use, and a sale is considered highly probable. They are stated at the lower of their carrying amount and fair value less costs to sell. An impairment loss is recognised in the Consolidated Income Statement for any initial or subsequent write-down of the asset to fair value less costs to sell. A gain is recognised in the Consolidated Income Statement for any subsequent increases in fair value less costs to sell of an asset, but not in excess of any cumulative impairment loss previously recognised.

A gain or loss not previously recognised by the date of the sale of the non-current asset is recognised in the Consolidated Income Statement at the date of derecognition. Non-current assets are not depreciated or amortised while they are classified as held for sale and are presented separately from the other assets in the Consolidated Statement of Financial Position.

### (r) Investments

Investments in subsidiaries are stated at cost less any impairment in value.

### (s) Impairment of non-financial assets

Intangible assets that have an indefinite useful life or intangible assets that are not available for use are not subject to amortisation and are tested annually for impairment. Other intangible assets and items of property, plant and equipment with finite useful lives are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount may not be recoverable.

An impairment loss is recognised for the amount by which the asset's carrying amount exceeds its recoverable amount. The recoverable amount is the higher of an asset's fair value less costs to sell and value in use. In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset for which the estimates of future cash flows have not been adjusted. Where assets do not generate cash flows independently from other assets, the Group estimates the recoverable amount of the cash-generating unit to which the asset belongs.

If the recoverable amount of an asset or cash-generating unit is estimated to be less than its carrying amount, the carrying amount of the asset or cash-generating unit is reduced to its recoverable amount. Prior impairments of non-financial assets (other than goodwill) are reviewed for possible reversal at each reporting date.

### (t) Inventories

Inventories are stated at the lower of cost, including attributable overheads, and net realisable value. Cost is calculated using the weighted average method in Technical Consulting and using the first-in, first-out method in Performance Products. Work in progress is stated at cost, including attributable overheads, less any foreseeable losses and progress payments received and receivable.

### (u) Financial instruments

#### *Non-derivative financial instruments*

The Group's non-derivative financial instruments comprise trade receivables, trade payables, cash and cash equivalents and borrowings. In the Statements of Cash Flow, cash and cash equivalents comprise cash balances and bank overdrafts repayable on demand. In the Statements of Financial Position, bank overdrafts are shown within borrowings in current liabilities and bank loans are shown within borrowings in non-current liabilities.

Trade receivables and payables are measured initially at fair value, and subsequently at amortised cost. Trade receivables are stated net of allowances for irrecoverable amounts. Evidence of impairment of trade receivables include indications that customers are experiencing significant financial difficulty or have significantly overdue balances.

Borrowings are recognised initially at fair value net of direct issue costs and subsequently at amortised cost using the effective interest rate method. Differences between initial value and redemption value are recorded in the Consolidated Income Statement over the period of the loan.

The fair values of non-derivative financial instruments other than loans due for repayment after more than one year are approximately equal to their book values. The fair value of loans due for repayment after more than one year is estimated by discounting the future contractual cash flows at the current market interest rate available to the Group for similar financial instruments.

#### *Derivative financial instruments*

Derivative financial instruments are initially recognised and measured at fair value on the date a derivative contract is entered into and subsequently measured at fair value and the gain or loss on remeasurement is taken to the Consolidated Income Statement.

The Group employs derivative financial instruments, including foreign exchange contracts, to mitigate currency exposures on trading transactions. The Group does not hedge forecast transactions that will result in the recognition of a non-financial asset or liability. Fair values of derivative financial instruments are based on the market values of similar instruments at the reporting date.

### (v) Provisions

A provision is required when the Group has a present legal or constructive obligation at the reporting date as a result of a past event and it is probable that settlement will be required of an amount that can be reliably estimated.

Provisions for warranty costs are recognised at the date of sale of the relevant products, at the Directors' best estimate of the expenditure required to settle the Group's liability. Provisions for dilapidations reflects the Directors' best estimate of future obligations relating to the maintenance of leasehold properties arising from past events such as lease renewals or terminations.

These estimates are reviewed each year and updated as necessary.

### (w) Specific adjusting items

Specific adjusting items are disclosed separately in the financial statements where it is necessary to do so to provide further understanding of the financial performance of the Group and due to the significance of their nature or amount. These items comprise amortisation of acquired intangible assets, acquisition-related expenditure and reorganisation costs. Acquisition-related expenditure is incurred by the Group to effect a business combination, including the costs associated with the integration of acquired businesses together with dual-running costs incurred during a transitional

## 1 Accounting policies (continued)

### (w) Specific adjusting items (continued)

services period. In the prior year, non-recurring income for claims under the Research & Development Expenditure Credit ('RDEC') scheme in respect of previous years were also included in specific adjusting items.

### (x) New standards and interpretations

At 30 June 2017, the International Accounting Standards Board ('IASB') and IFRS IC had issued the standards and amendments, shown below, that subject to adoption by the EU, are effective after the current year-end and have not been early adopted by the Group.

It is not expected that the adoption of the standards and amendments listed above will have a significant impact on the financial statements of the Group in future periods, with the exception of IFRS 15 'Revenue from Contracts with Customers' and IFRS 16 'Leases', which may have a significant impact on revenue recognition and capitalisation of operating leases, respectively, together with the related disclosures. Further detail is set out below:

Issued standards and amendments not yet effective	Effective date (periods commencing)	Endorsed by EU
<i>International Financial Reporting Standards</i>		
IFRS 9 'Financial Instruments'	1 Jan 2018	Yes
IFRS 15 'Revenue from Contracts with Customers'	1 Jan 2018	Yes
IFRS 16 'Leases'	1 Jan 2019	No
IFRS 17 'Insurance Contracts'	1 Jan 2021	No
<i>Amendments to International Financial Reporting Standards</i>		
IAS 7 'Statement of Cash Flows'	1 Jan 2017	No
IAS 12 'Income Taxes'	1 Jan 2017	No
IAS 28 'Investments in Associates'	Deferred indefinitely	No
IAS 40 'Investment Property'	1 Jan 2018	No
IFRS 2 'Share-based Payment'	1 Jan 2018	No
IFRS 4 'Insurance Contracts'	1 Jan 2018	No
IFRS 10 'Consolidated Financial Statements'	Deferred indefinitely	No
IFRS 15 'Revenue from Contracts with Customers'	1 Jan 2018	No
IFRIC 22 'Foreign Currency Transactions and Advance Consideration'	1 Jan 2018	No
IFRIC 23 'Uncertainty over Income Tax Treatments'	1 Jan 2019	No
Annual Improvements 2014-2016 Cycle	1 Jan 2017 / 1 Jan 2018	No

IFRS 15 'Revenue from contracts with customers' establishes principles for reporting the nature, amount and timing of revenue arising from an entity's contracts with customers. The standard becomes effective for the Group for the financial year ending 30 June 2019 and the Group's current intention is to apply the full retrospective approach upon adoption of IFRS 15. This approach requires all open contracts with customers that are presented in the financial statements for the year ending 30 June 2019 to be transitioned under the new standard. Comparative financial information for the financial year ending 30 June 2018 will be restated, together with a cumulative adjustment to equity as at 1 July 2017. The full impact of IFRS 15 on the Group is currently being assessed and whilst a detailed exercise is required in order to fully identify and quantify the required changes in revenue recognition, the principal areas of the Group's existing accounting policies which are presently expected to be affected by the new standard are set out below:

#### Technical Consulting

- Revenue from performance of 'fixed price' and 'time and materials' contracts (2017 revenue: £282.4m): it is likely that revenue on the majority of contracts under standard terms and conditions for which revenue is currently recognised within the Technical Consulting segment will continue to be accounted for over time as performance occurs, with revenue recognised as a percentage of total contract value, calculated as cost incurred to date over total expected costs at completion. A small number of contracts may no longer qualify to be accounted for over time and revenue will instead be deferred until completion of the contract. Contracts in existence on the effective date with non-standard or customer-specified terms and conditions will need to be assessed on a case-by-case basis to determine the method of revenue recognition.
- Revenue from subscription services (2017 revenue: £5.1m): other contracts relate to the supply of annual subscription services, for which revenue from renewals is recognised on a straight-line basis over the period of subscription. For new and upgrading customers where significant administrative effort is required to set up the services to be provided, revenue is recognised based on the fair value of the initial work performed. As a result of the new standard, it is likely that the total contract value will be recognised on a straight-line basis over the period of subscription for all customers. This could result in a change in revenue depending upon the timing of signing contracts with new and upgrading customers

#### Performance Products

- Revenue from sale of goods excluding perpetual software licences (2017 revenue: £56.8m): the timing of revenue recognised on the majority of such contracts is not expected to be significantly affected by IFRS 15 with revenue continuing to be recognised as control of the goods are passed to the customer, which is typically on delivery of goods to the customer.
- Revenue from software licences: (2017 revenue: £7.8m): revenues are also derived from the sale of software licences which can be leased by the customer or the customer can purchase a perpetual licence for indefinite use. Both types of licence sale can include maintenance and support. It is likely that revenue derived from leased software licences will continue to be recognised over the period of the lease on a straight-line basis. For perpetual licence sales, the fair value and purchase price is clearly set out within the contract, and is separable from any associated maintenance element, which is a standalone product that can be purchased in future years. Revenue recognition for perpetual software licence sales is therefore not currently expected to change, with the value of the perpetual licence being recognised when the software and the associated licence key has been delivered to the customer. With both types of licence sale, it is likely that any associated maintenance and support will continue to be recognised over the term of the maintenance and support agreement on a straight-line basis.

IFRS 16 'Leases' sets out the requirements for the recognition of operating leases on the Statement of Financial Position. This requires a 'right of use' asset to be recognised as a non-current asset, together with the associated liability which represents the present value of the financial commitment. As at 30 June 2017, the Group has a future commitment in respect of operating leases which expire in more than 12 months from the reporting date of £48.8m, primarily in respect of property leases, and for which the present value is likely to be recognised on the Statement of Financial Position at transition. This standard becomes effective to the Group for the financial year ending 30 June 2020. This standard is subject to endorsement by the European Union.



## 2 Operating segments

The Group's operating segments are being reported based on the financial information provided to the Chief Operating Decision Maker who is the Chief Executive Officer. The reportable segments are Technical Consulting and Performance Products. These were identified by evaluating the Group's products and services, processes, types of customers and delivery methods.

- Technical Consulting generates income from the delivery of engineering programmes and technology projects, together with environmental and management consultancy services. This operating segment also generates income from independent assurance services provided through the Group's rail business.
- Performance Products generates income from manufacturing, assembly, software sales and related services.

Inter-segment revenue is eliminated on consolidation. Transactions are entered into on an arm's length basis in a manner similar to transactions with third parties.

Management monitors the results of its operating segments separately for the purpose of making decisions about allocating resources and assessing performance. Segment performance is measured based on operating profit. Included within the Head Office column in the following tables are functions managed by a central division, including the costs of running the public limited company, which are recharged to the other operating segments.

### Year ended 30 June 2017

	Technical Consulting £m	Performance Products £m	Head Office £m	Total £m
Total segment revenue	280.6	73.3	-	353.9
Inter-segment revenue	(0.1)	(1.7)	-	(1.8)
<b>Revenue from external customers</b>	<b>280.5</b>	<b>71.6</b>	<b>-</b>	<b>352.1</b>
Underlying operating profit	32.8	8.0	-	40.8
Specific adjusting items	(5.0)	-	(1.1)	(6.1)
Operating profit	27.8	8.0	(1.1)	34.7
Net finance costs	-	-	(2.5)	(2.5)
<b>Profit before taxation</b>	<b>27.8</b>	<b>8.0</b>	<b>(3.6)</b>	<b>32.2</b>
<b>Total assets per financial statements</b>	<b>280.6</b>	<b>42.7</b>	<b>17.1</b>	<b>340.4</b>
<b>Total liabilities per financial statements</b>	<b>68.9</b>	<b>18.5</b>	<b>97.3</b>	<b>184.7</b>
Depreciation and amortisation	12.2	2.2	1.9	16.3
Capital expenditure - other intangible assets	2.9	1.6	1.1	5.6
Capital expenditure - property, plant and equipment	5.9	0.2	0.2	6.3

Revenues from one customer represent approximately £48.2m of the Group's external revenue, of which £43.9m is reported in the Performance Products segment and £4.3m is reported in the Technical Consulting segment.

Revenues from a second customer no longer represent more than 10% of the Group's external revenue.

Underlying operating profit for the year ended 30 June 2017 includes £6.6m of income in respect of RDEC, which has been allocated between Technical Consulting for £5.9m and Performance Products for £0.7m on a basis that is consistent with the segment in which the qualifying expenditure is incurred.

## 2 Operating segments (continued)

Year ended 30 June 2016

	Technical Consulting £m	Performance Products £m	Head Office £m	Total £m
Total segment revenue	269.0	65.1	-	334.1
Inter-segment revenue	(1.1)	(0.6)	-	(1.7)
Revenue from external customers	267.9	64.5	-	332.4
Underlying operating profit	32.5	7.1	-	39.6
Specific adjusting items	(4.4)	0.2	(0.5)	(4.7)
Operating profit	28.1	7.3	(0.5)	34.9
Net finance costs	-	-	(1.9)	(1.9)
Profit before taxation	28.1	7.3	(2.4)	33.0
Total assets per financial statements*	256.1	36.1	17.3	309.5
Total liabilities per financial statements*	57.2	17.9	94.9	170.0
Depreciation and amortisation	10.4	1.7	1.8	13.9
Capital expenditure - other intangible assets	4.5	1.5	0.2	6.2
Capital expenditure - property, plant and equipment	7.8	0.2	0.3	8.3

(\*) As set out in more detail in Note 1(l), the prior year classification of the Group's total assets and liabilities between operating segments in respect of claims under the Research & Development Expenditure Credit ('RDEC') scheme have been restated.

Revenues from one customer represent approximately £40.0m of the Group's external revenue, of which £38.0m is reported in the Performance Products segment and £2.0m is reported in the Technical Consulting segment.

Revenues from a second customer represent approximately £36.7m of the Group's external revenue, of which £36.5m was reported in the Technical Consulting segment and £0.2m was reported in the Performance Products segment.

Underlying operating profit for the year ended 30 June 2016 includes £5.4m of income in respect of RDEC, which has been allocated between Technical Consulting for £4.7m and Performance Products for £0.7m on a basis that is consistent with the segment in which the qualifying expenditure is incurred.

### Non-current assets by geographical location (excluding deferred tax assets)

Asset location	2017 £m	2016 £m
United Kingdom	80.7	84.8
Germany	18.8	12.6
Netherlands	22.0	21.4
United States	9.6	18.3
Rest of the World	11.3	8.8
<b>Total</b>	<b>142.4</b>	<b>145.9</b>

### 3 Revenue

#### (a) Revenue by category

	2017	2016
	£m	£m
Rendering of services	294.9	274.8
Sale of goods	57.2	57.6
<b>Total</b>	<b>352.1</b>	<b>332.4</b>

#### (b) Revenue by customer location

	2017	2016
	£m	£m
United Kingdom	144.5	154.2
Germany	27.6	24.7
Netherlands	21.8	18.5
Rest of Europe	43.9	22.7
Europe total	237.8	220.1
North America	38.6	39.2
China	32.7	21.4
Japan	16.3	18.1
Rest of Asia	17.9	26.7
Asia total	66.9	66.2
Rest of the World	8.8	6.9
<b>Total</b>	<b>352.1</b>	<b>332.4</b>

### 4 Specific adjusting items

	2017	2016
	£m	£m
Amortisation of acquisition-related intangible assets (Note 14)	4.0	3.4
Acquisition-related expenditure associated with LR Rail <sup>(1)</sup>	0.1	1.6
Other acquisition-related expenditure <sup>(2)</sup>	1.6	1.2
Reorganisation costs <sup>(3)</sup>	0.4	-
Non-recurring income for RDEC claims in respect of prior years <sup>(4)</sup>	-	(1.5)
<b>Total</b>	<b>6.1</b>	<b>4.7</b>

(1) The expenditure associated with the Lloyd's Register Rail ('LR Rail') acquisition comprises costs incurred in the years ended 30 June 2017 and 30 June 2016 associated with the integration of the LR Rail businesses subsequent to their acquisition, together with dual-running costs incurred during a transitional services period with Lloyd's Register. In the current year, expenditure has been incurred of £0.5m, offset by £0.4m of fair value provisions recognised on acquisition which have been released within specific adjusting items where those risks will not crystallise as originally anticipated.

(2) Other acquisition-related expenditure primarily comprises costs incurred in the years ended 30 June 2017 and 30 June 2016 for services rendered to, and consumed by, the Group to effect the Motorcycle Engineering Italia (Exnovo) and Control Point Corporation acquisitions (see Notes 12 and 39, respectively), together with the Cascade acquisition in the previous financial year. The expenditure also comprises costs associated with the integration of the Motorcycle Engineering Italia (Exnovo) and Cascade businesses subsequent to their acquisition. In addition, the costs of the associated earn-out arrangements of the Motorcycle Engineering Italia (Exnovo) acquisition, together with the Cascade, Power Planning Associates and Vepro acquisitions made in prior years are also included.

(3) Reorganisation costs relate to expenditure incurred as a result of the formation of the new Global Automotive structure from the operations of the Group's Automotive technical centres across Europe, China and North America. The costs incurred in the year comprised initial planning activities undertaken to implement a reorganisation of Europe Technical Consulting into Automotive EMEA in order to align with the new Global Automotive structure for which a detailed formal plan has now been announced. In addition, activities were also undertaken during the year to prepare the test cell and related assets at the Group's technical centre in Chicago for disposal (see Note 19).

(4) On 2 July 2013, legislation was enacted to allow UK companies to elect for the Research and Development Expenditure Credit ('RDEC') on qualifying expenditure incurred since 1 April 2013, instead of the 'super-deduction' rules, which were abolished from 1 April 2016. Management elected to adopt the RDEC regime as of 1 July 2015, which also permitted claims to be made on qualifying expenditure under RDEC in excess of the tax relief received under the legacy scheme since 1 July 2013. The credit in the prior year related to claims made for the excess in RDEC over the tax relief received under the legacy scheme in the two years between enactment and adoption. The credit was recorded as other income and classified as a specific adjusting item on the basis that it was non-recurring and there was no corresponding expenditure against which these credits could be offset.



## 5 Operating profit

	2017	2016
	£m	£m
The following items have been charged/(credited) in arriving at operating profit:		
Amortisation of other intangible assets (Note 14)	9.1	7.4
Depreciation of property, plant and equipment (Note 15)	7.2	6.5
Cost of inventories recognised as expense	34.6	31.6
Research and Development Expenditure Credits ('RDEC')	(6.6)	(6.9)
Operating lease rentals payable	8.0	7.4
Repairs and maintenance on property, plant and equipment	4.1	3.7
Redundancy and termination costs	0.6	0.9
Profit on sale and leaseback of property (Note 15)	(0.7)	-
Net impairment losses on trade receivables (Note 18)	0.2	0.8
	<b>2017</b>	<b>2016</b>
	<b>£m</b>	<b>£m</b>
With respect to the Group's research and development activities, the following items have been charged/(credited) in arriving at operating profit:		
Research and development expenditure in the year	6.4	6.2
Government grant income received in respect of part of this expenditure	(2.4)	(1.3)
<b>Total</b>	<b>4.0</b>	<b>4.9</b>

## 6 Auditors' remuneration

	2017	2016
	£m	£m
During the year the Group obtained the following services from the Parent Company's auditors and its associates:		
Fees payable for the statutory audit of the Parent Company and consolidated financial statements <sup>(1)</sup>	0.2	0.2
Fees payable for the statutory audit of the Parent Company's subsidiaries and financial statements <sup>(2)</sup>	0.2	0.2
<b>Total audit fees</b>	<b>0.4</b>	<b>0.4</b>
Fees payable for audit-related assurance services <sup>(3)</sup>	0.1	0.1
Fees payable for other non-audit services <sup>(4)</sup>	0.2	0.1
<b>Total non-audit fees</b>	<b>0.3</b>	<b>0.2</b>

(1) Fees payable during the year to the Parent Company's auditors and its associates for the statutory audit of the Parent Company and consolidated financial statements were £246,000 (2016: £236,000).

(2) Fees payable during the year to the Parent Company's auditors and its associates for the statutory audit of the Parent Company's subsidiaries and financial statements were £204,000 (2016: £193,000).

(3) Fees payable during the year to the Parent Company's auditors and its associates for audit-related assurance services were £78,000 (2016: £49,000) and comprised of £43,000 (2016: £49,000) pursuant to the interim review and £35,000 (2016: £Nil) to assess the potential impact from the implementation of IFRS 15 'Revenue from contracts with customers'. Our current expectations arising from this preliminary assessment are described in Note 1(x).

(4) Fees payable during the year to the Parent Company's auditors and its associates for other non-audit services were £217,000 (2016: £117,000) and comprised of £186,000 (2016: £86,000) for due diligence in respect of completed and proposed acquisitions and £31,000 (2016: £31,000) for other services.

Total non-audit fees payable to the external auditors for audit-related assurance services and other non-audit services for the financial year were 66% (2016: 39%) of total audit fees. These non-audit fees primarily comprised of services provided in respect of due diligence on targets for acquisition. It was considered to be in the interests of the Group to purchase these services from the external auditors due to their in-depth knowledge of the Group.

## 7 Employees

	2017	2016
	£m	£m
Staff costs		
Wages and salaries (including redundancy and termination costs)	140.1	135.8
Social security costs	15.7	14.0
Other pension costs (Note 25)	9.1	8.7
Share-based payments (Note 30)	1.6	1.5
<b>Total employee benefit expense</b>	<b>166.5</b>	<b>160.0</b>

	2017	2016
	Number	Number
Average monthly number of employees (including executive directors) during the year		
Technical Consulting	2,343	2,389
Performance Products	316	249
Head Office	51	45
<b>Total average headcount</b>	<b>2,710</b>	<b>2,683</b>

	2017	2016
	£m	£m
Key management compensation		
Short-term employee benefits	3.7	3.8
Share-based payments	1.2	1.3
Post-employment benefits	0.2	0.2
<b>Total key management compensation</b>	<b>5.1</b>	<b>5.3</b>

The key management personnel are the Board of Directors, together with the Managing Directors who report directly to the Chief Executive Officer. The remuneration received by all executive and Non-Executive Directors during the year is disclosed in the Directors' Remuneration Report on page 96.

## 8 Net finance costs

	2017	2016
	£m	£m
Finance income:		
Bank interest receivable	0.2	0.3
	<b>0.2</b>	<b>0.3</b>
Finance costs:		
Interest payable on bank borrowings	(2.1)	(1.5)
Defined benefit pension financing costs (Note 25)	(0.6)	(0.7)
	<b>(2.7)</b>	<b>(2.2)</b>
<b>Net finance costs</b>	<b>(2.5)</b>	<b>(1.9)</b>

## 9 Taxation

	2017 £m	2016 £m
Current income tax:		
UK corporation tax	5.2	5.9
Adjustments in respect of prior years	(0.2)	(0.5)
Total UK tax	5.0	5.4
Foreign corporation tax	1.1	2.1
Adjustments in respect of prior years	0.1	-
Total foreign tax	1.2	2.1
Total current tax	6.2	7.5
Deferred tax:		
Charge for year relating to temporary differences	1.8	0.5
Adjustments in respect of prior years	(0.6)	(0.6)
Total deferred tax	1.2	(0.1)
<b>Total taxation</b>	<b>7.4</b>	<b>7.4</b>
Tax on items recognised in other comprehensive income	(0.8)	(0.7)
Tax on items recognised directly in equity	(0.1)	(0.2)

Tax on items recognised in other comprehensive income relate to the tax impact of remeasurements of the defined benefit scheme. Tax on items recognised directly in equity relate to equity-settled share-based payment transactions.

Changes to the UK corporation tax rates were substantively enacted as part of the Finance Bill 2016 on 15 September 2016. These include reductions to the main rate to 19% from 1 April 2017 and to 17% from 1 April 2020. Deferred taxes at the reporting date have been measured and reflected in these financial statements by using the enacted rate within each jurisdiction. For UK entities, the tax rates of 19% and 17% have been used according to the rate at which the relevant assets or liabilities are expected to unwind.

The tax charge for the year is higher (2016: higher) than the standard rate of corporation tax in the UK. The differences are set out below:

	2017 £m	2016 £m
Profit for the year before tax	32.2	33.0
Profit for the year multiplied by the average enacted rate of corporation tax in the UK of 19.75% (2016: 20%)	6.4	6.6
Effects of:		
Losses not recognised	0.8	0.8
(Non-taxable income)/expenses not deductible for tax purposes	(0.7)	0.5
Government tax incentives <sup>(1)</sup>	(0.1)	(0.1)
Irrecoverable overseas tax <sup>(2)</sup>	-	0.5
Other overseas taxes	0.2	-
Adjustments in respect of prior years	(0.7)	(1.1)
Changes in corporation tax rates	-	0.2
Derecognition of deferred taxes	1.5	-
<b>Total taxation</b>	<b>7.4</b>	<b>7.4</b>

(1) Primarily relates to R&D tax credits

(2) Primarily relates to withholding taxes



## 10 Earnings per share

Basic earnings per share is calculated by dividing the earnings attributable to ordinary shareholders by the weighted average number of shares outstanding during the year, excluding those held by an employee benefit trust for the Long-Term Incentive Plan ('LTIP') and by the Share Incentive Plan ('SIP') for the free share scheme which are treated as cancelled for the purposes of the calculation.

For diluted earnings per share, the weighted average number of ordinary shares in issue is adjusted to assume conversion of all dilutive potential ordinary shares. These include potential awards of LTIP shares and options granted to employees where the exercise price is less than the market price of the Company's ordinary shares at year-end.

Reconciliations of the earnings and the weighted average number of shares used in the calculations are set out below. Underlying earnings per share is also shown because the Directors consider that this provides a more useful indication of underlying performance and trends over time.

	2017	2016
	£m	£m
<b>Earnings attributable to owners of the parent</b>	<b>24.8</b>	25.6
Add back amortisation of acquisition-related intangible assets (net of tax)	3.1	2.7
Add back acquisition-related expenditure associated with LR Rail (net of tax)	0.1	1.3
Add back other acquisition-related expenditure (net of tax)	1.2	1.0
Add back reorganisation costs (net of tax)	0.3	-
Less non-recurring income for RDEC claims in respect of prior years	-	(1.5)
<b>Underlying earnings attributable to owners of the parent</b>	<b>29.5</b>	29.1

	2017	2016
	Number of shares millions	Number of shares millions
<b>Basic weighted average number of shares in issue</b>	<b>53.0</b>	52.7
Effect of dilutive potential shares	0.4	0.5
<b>Diluted weighted average number of shares in issue</b>	<b>53.4</b>	53.2

	2017	2016
	pence	pence
<b>Earnings per share</b>		
Basic	46.8	48.6
Diluted	46.4	48.1

	2017	2016
	pence	pence
<b>Underlying earnings per share</b>		
Basic	55.7	55.2
Diluted	55.2	54.7

## 11 Dividends

	2017	2016
	£m	£m
Final dividend for the year ended 30 June 2016 of 13.03p (2015: 11.95p) per share	6.9	6.3
Interim dividend for the year ended 30 June 2017 of 5.42p (2016: 5.07p) per share	2.9	2.6
<b>Equity dividends paid</b>	<b>9.8</b>	8.9

The Directors are proposing a final dividend in respect of the financial year ended 30 June 2017 of 13.88p per share which will utilise £7.4m of retained earnings. It will be paid on 17 November 2017 to shareholders who are on the register of members at the close of business on 27 October 2017, subject to approval at the Annual General Meeting on 8 November 2017.

## 12 Acquisitions

On 29 July 2016 the Group acquired the entire issued share capital of Motorcycle Engineering Italia s.r.l., which was subsequently renamed Ricardo Motorcycle Italia s.r.l., for total cash consideration of £1.9m (€2.2m). This business was formed from the operating assets and employees of Exnovo s.r.l., a vehicle design house which creates class-leading aesthetics for global motorcycle and scooter brands.

The following table sets out the consideration paid for Motorcycle Engineering Italia s.r.l., together with the fair value of the assets acquired and liabilities assumed:

	£m
<b>Cash consideration</b>	<b>1.9</b>
<b>Fair value of identifiable assets acquired and liabilities assumed</b>	
Customer contracts and relationships (Note 14)	0.2
Other intangible assets (Note 14)	0.1
Trade and other receivables	0.9
Trade and other payables	(2.4)
Provisions	(0.1)
<b>Total fair value of identifiable net assets</b>	<b>(1.3)</b>
Goodwill	3.2
<b>Total</b>	<b>1.9</b>

All of the cash consideration of £1.9 was paid in the year.

Adjustments have been made to identifiable assets and liabilities on acquisition to reflect their fair value. These include the recognition of customer-related intangible assets amounting to £0.2m. The fair values of net assets acquired were identified following a valuation exercise in accordance with the requirements of IFRS 3 'Business Combinations'.

The goodwill arising on acquisition can be ascribed to the existence of a skilled, active workforce, developed expertise and processes and the opportunities to obtain new contracts and develop the business. None of these meet the criteria for recognition as intangible assets separable from goodwill. None of the goodwill recognised is expected to be deductible for tax purposes.

The fair value of trade and other receivables of £0.9m includes net trade receivables of £0.4m and amounts recoverable on contracts of £0.2m, all of which is expected to be collectible.

Acquisition-related expenditure of £0.8m has been charged to the Consolidated Income Statement for the year ended 30 June 2017 and is disclosed as a specific adjusting item in Note 4.

The revenue included in the Consolidated Income Statement in relation to the acquired business was £3.0m. The underlying operating profit over the same period was £Nil. This is reported in the Technical Consulting segment.

Had Motorcycle Engineering Italia s.r.l. been acquired and consolidated from 1 July 2016, revenue and underlying operating profit in the Consolidated Income Statement would be £0.3m higher and £0.1m lower, respectively, based on available information for the month from 1 July 2016 to the acquisition date.

## 13 Goodwill

Group	£m
At 1 July 2015	26.0
Acquisition of business	26.7
Exchange adjustments	4.3
At 30 June 2016	57.0
Acquisition of business (Note 12)	3.2
Completion of fair value exercise <sup>(1)</sup>	0.2
Exchange adjustments	1.6
<b>At 30 June 2017</b>	<b>62.0</b>

The recoverable amount of each CGU is calculated by assessing its value in use, which is determined by performing discounted future pre-tax cash flow calculations for a five-year period and projected into perpetuity. The five-year cash flow forecasts are based on the budget for the following year (year one), the business plans for years two and three (the three-year plan), and operating profit projections for years four and five, with an 70% operating cash flow conversion rate.

The three-year plan is prepared by management, reviewed and approved by the Board, and reflects past experience, management's assessment of the current contract portfolio, contract wins, contract retention, price increases, gross margin, as well as future expected market trends. Operating profit projections for years four and five, and cash flows beyond year five are projected into perpetuity using a long-term growth rate, which is determined as the lower of the planned growth rate in year three and the external forecast of the economic growth rate for the economies in which the CGU primarily operates.

Apart from operating cash flows and economic growth rates, the other key assumption is the pre-tax discount rate, which is derived from externally sourced data and reflects the current market assessment of the Group's time value of money and risks specific to each CGU.

The carrying value of goodwill and key assumptions used in determining the recoverable amount of each CGU are as follows:

	Goodwill		Pre-tax discount rate		Growth rate into perpetuity	
	2017 £m	2016 £m	2017 %	2016 %	2017 %	2016 %
Ricardo Rail <sup>(1)</sup>	27.6	26.6	10.1	9.5	4.9	4.6
Ricardo Automotive EMEA (formerly Ricardo Europe Technical Consulting) <sup>(2)</sup>	20.0	14.6	8.6	8.9	4.2	3.6
Ricardo Energy & Environment	13.3	13.3	8.7	8.7	4.2	3.6
Ricardo Motorcycle <sup>(2)(3)</sup>	n/a	1.4	n/a	7.0	n/a	3.3
Ricardo Performance Products	1.1	1.1	8.7	8.7	4.2	3.6
<b>At 30 June</b>	<b>62.0</b>	<b>57.0</b>				

(1) The fair value assessment of the Chinese Rail operations that were acquired from Lloyd's Register on 1 March 2016 was completed on 28 February 2017. The completion of this exercise resulted in an addition of £0.2m to this CGU. The remaining increase in the value of this CGU is as a result of a retranslation adjustment of £0.8m in respect of foreign exchange.

(2) Subsequent to the acquisition and integration described in footnote (3) which added £3.2m of goodwill to Ricardo Motorcycle, that business was fully integrated and subsumed within the European Technical Consulting business. This represents the lowest level at which goodwill is monitored for internal management purposes and represents the smallest identifiable group of assets that generates independent future cash inflows. Consequently, the carrying value of the goodwill allocated to the Ricardo Motorcycle CGU at that point of £4.6m has been reallocated to the Ricardo Europe Technical Consulting CGU. The remaining increase in the value of this CGU is as a result of a retranslation adjustment of £0.8m in respect of foreign exchange. As set out in Note 4, the CGU was renamed Ricardo Automotive EMEA in anticipation of a planned reorganisation of the Group's Global Automotive business.

(3) As set out in further detail in Note 12, the Group acquired Motorcycle Engineering Italia (Exnovo) on 29 July 2016 for its class-leading aesthetics for global motorcycle and scooter brands which provides Ricardo Motorcycle with additional capability and reach. The identifiable post-acquisition assets and liabilities of Motorcycle Engineering Italia (Exnovo), as well as its employees and contracts were subsumed and fully integrated into Ricardo Motorcycle, adding £3.2m of goodwill to the CGU.

The three-year plan and discounted cash flow calculations thereon provide a value in use which supports the carrying value of the goodwill allocated to each CGU at 30 June 2017, resulting in no impairment for the year (2016: £Nil). In considering sensitivities, no reasonable change in any of the above key assumptions would cause the value in use of the CGUs to fall below the carrying value of the allocated goodwill. The sensitivities assessed include a 10% reduction in planned operating profit, a 20% reduction in the planned operating cash flow conversion rate and a 1% increase in the pre-tax discount rate, together with a further scenario whereby all sensitivities are combined together.



## 14 Other intangible assets

Group	Acquisition-related intangible assets				Total £m
	Customer contracts and relationships £m	Other £m	Software £m	Development costs £m	
<b>Cost</b>					
At 1 July 2015	9.2	0.3	18.5	8.6	36.6
Acquisition of business	14.0	1.3	-	-	15.3
Additions	-	-	3.0	3.2	6.2
Reclassifications	-	-	0.3	-	0.3
Exchange rate adjustments	1.7	0.2	0.7	0.7	3.3
At 30 June 2016	24.9	1.8	22.5	12.5	61.7
Acquisition of business (Note 12)	0.2	-	0.1	-	0.3
Additions	-	-	2.5	3.1	5.6
Disposals	-	-	(0.7)	-	(0.7)
Reclassifications	-	-	0.1	(0.1)	-
Exchange rate adjustments	0.4	0.1	0.2	-	0.7
<b>At 30 June 2017</b>	<b>25.5</b>	<b>1.9</b>	<b>24.7</b>	<b>15.5</b>	<b>67.6</b>
<b>Accumulated amortisation</b>					
At 1 July 2015	3.0	0.1	12.8	1.8	17.7
Charge for the year	3.3	0.1	1.9	2.1	7.4
Reclassifications	-	-	0.3	-	0.3
Exchange rate adjustments	0.2	-	0.6	0.2	1.0
At 30 June 2016	6.5	0.2	15.6	4.1	26.4
Charge for the year	3.7	0.3	2.1	3.0	9.1
Reclassifications	(0.2)	0.2	-	-	-
Disposals	-	-	(0.7)	-	(0.7)
Exchange rate adjustments	0.2	0.1	0.1	-	0.4
<b>At 30 June 2017</b>	<b>10.2</b>	<b>0.8</b>	<b>17.1</b>	<b>7.1</b>	<b>35.2</b>
<b>Net book value</b>					
<b>At 30 June 2017</b>	<b>15.3</b>	<b>1.1</b>	<b>7.6</b>	<b>8.4</b>	<b>32.4</b>
At 30 June 2016	18.4	1.6	6.9	8.4	35.3
At 30 June 2015	6.2	0.2	5.7	6.8	18.9

Company	Software £m
<b>Cost</b>	
At 1 July 2015	8.1
Additions	0.5
At 30 June 2016	8.6
Additions	0.2
<b>At 30 June 2017</b>	<b>8.8</b>
<b>Accumulated amortisation</b>	
At 1 July 2015	3.5
Charge for the year	1.3
At 30 June 2016	4.8
Charge for the year	1.3
<b>At 30 June 2017</b>	<b>6.1</b>
<b>Net book value</b>	
<b>At 30 June 2017</b>	<b>2.7</b>
At 30 June 2016	3.8
At 30 June 2015	4.6

Software for both the Group and the Company primarily comprises external purchase costs and internal costs that have been capitalised in respect of an ERP system. Software for the Group includes £0.4m (2016: £1.3m) and for the Company includes £0.3m (2016: £0.1m) in respect of assets under construction which are not being amortised until the assets are made available for use.

Development costs include £3.1m (2016: £2.7m) in respect of assets under construction which are not being amortised until the assets are made available for use.

The amortisation charge of £9.1m (2016: £7.4m) is comprised of £1.4m (2016: £1.8m) included within cost of sales and £7.7m (2016: £5.6m) included within administrative expenses in the Consolidated Income Statement.

## 15 Property, plant and equipment

Group	Freehold land and buildings £m	Leasehold property £m	Plant and machinery £m	Fixtures, fittings and equipment £m	Total £m
<b>Cost</b>					
At 1 July 2015	21.1	8.1	108.1	19.5	156.8
Acquisition of business	-	-	-	0.1	0.1
Additions	1.6	0.7	3.2	2.8	8.3
Disposals	-	-	(0.7)	(0.5)	(1.2)
Reclassifications	(0.3)	0.3	-	(0.3)	(0.3)
Exchange rate adjustments	0.5	0.3	6.6	1.2	8.6
At 30 June 2016	22.9	9.4	117.2	22.8	172.3
Additions	1.0	0.4	2.4	2.5	6.3
Disposals	-	(5.0)	(0.9)	(0.5)	(6.4)
Assets classified as held for sale (Note 19)	-	(0.8)	(11.3)	(0.2)	(12.3)
Reclassifications	-	-	0.8	(0.8)	-
Exchange rate adjustments	0.2	-	1.6	0.4	2.2
<b>At 30 June 2017</b>	<b>24.1</b>	<b>4.0</b>	<b>109.8</b>	<b>24.2</b>	<b>162.1</b>
<b>Accumulated depreciation</b>					
At 1 July 2015	4.3	4.3	83.2	15.4	107.2
Charge for the year	0.4	0.5	3.6	2.0	6.5
Disposals	-	-	(0.7)	(0.5)	(1.2)
Reclassifications	(0.1)	0.1	-	(0.3)	(0.3)
Exchange rate adjustments	0.2	0.2	5.1	1.0	6.5
At 30 June 2016	4.8	5.1	91.2	17.6	118.7
Charge for the year	0.5	0.5	4.0	2.2	7.2
Disposals	-	(2.8)	(0.9)	(0.5)	(4.2)
Assets classified as held for sale (Note 19)	-	(0.6)	(8.7)	(0.2)	(9.5)
Reclassifications	-	-	0.4	(0.4)	-
Exchange rate adjustments	0.1	-	1.4	0.4	1.9
<b>At 30 June 2017</b>	<b>5.4</b>	<b>2.2</b>	<b>87.4</b>	<b>19.1</b>	<b>114.1</b>
<b>Net book value</b>					
<b>At 30 June 2017</b>	<b>18.7</b>	<b>1.8</b>	<b>22.4</b>	<b>5.1</b>	<b>48.0</b>
At 30 June 2016	18.1	4.3	26.0	5.2	53.6
At 30 June 2015	16.8	3.8	24.9	4.1	49.6

The carrying value of assets under construction included in property, plant and equipment amounts to £1.0m (2016: £2.8m).

At 30 June 2017, contracts had been placed for future capital expenditure, which have not been provided for in the financial statements, amounting to £1.5m (2016: £2.6m).

## 15 Property, plant and equipment (continued)

Company	Land and buildings £m	Leasehold property £m	Fixtures, fittings and equipment £m	Total £m
<b>Cost</b>				
At 1 July 2015	5.7	6.0	0.8	12.5
Additions	-	-	0.2	0.2
At 30 June 2016	5.7	6.0	1.0	12.7
Disposals	-	(4.9)	-	(4.9)
<b>At 30 June 2017</b>	<b>5.7</b>	<b>1.1</b>	<b>1.0</b>	<b>7.8</b>
<b>Accumulated depreciation</b>				
At 1 July 2015	1.8	2.9	0.2	4.9
Charge for the year	0.1	0.2	0.2	0.5
At 30 June 2016	1.9	3.1	0.4	5.4
Charge for the year	0.1	0.2	0.2	0.5
Disposals	-	(2.8)	-	(2.8)
<b>At 30 June 2017</b>	<b>2.0</b>	<b>0.5</b>	<b>0.6</b>	<b>3.1</b>
<b>Net book value</b>				
<b>At 30 June 2017</b>	<b>3.7</b>	<b>0.6</b>	<b>0.4</b>	<b>4.7</b>
At 30 June 2016	3.8	2.9	0.6	7.3
At 30 June 2015	3.9	3.1	0.6	7.6

On 23 June 2017, an agreement was reached to sell and lease back a property for £4.0m that had been built on leased premises together with an increase in annual rent charges of £0.3m over an extended lease term. The profit on disposal of the property after transaction costs was £1.8m, of which £0.7m has been recognised within underlying profit before tax in the Consolidated Income Statement. The remaining £1.1m has been recognised in the Statement of Financial Position and will be offset against the increase in annual rent charges over the remaining term of the extended lease agreement for the premises on which the property was built. The depreciation charged on the property until the point of sale was included within administrative expenses in the Consolidated Income Statement.

A contingent liability of up to £2.8m which is associated with a guarantee provided to the Ricardo Group Pension Fund in July 2013 (see Note 36) is secured on specific land and buildings.

## 16 Investments

Company	Shares in subsidiaries £m
At 1 July 2015 and 30 June 2016	73.9
Additions	29.3
Disposals	(0.1)
<b>At 30 June 2017</b>	<b>103.1</b>

The addition in the year relates to an intercompany receivable held with an indirectly owned subsidiary, which was novated to a directly owned subsidiary as a contribution to its capital. The disposal in the year relates to the investments held in dormant entities which were liquidated during the year.

Details of the Company's subsidiaries are shown in Note 38.

The Directors consider that the fair value of investments is not less than the carrying value.

## 17 Inventories

Group	2017 £m	2016 £m
Raw materials and consumables	9.2	7.3
Work in progress	3.8	2.9
Finished goods	0.9	0.8
<b>At 30 June</b>	<b>13.9</b>	<b>11.0</b>

During the year £0.2m (2016: £0.2m) of inventory was written down and included in cost of sales in the Consolidated Income Statement.



## 18 Trade and other receivables

	Group		Company	
	2017	2016	2017	2016
	£m	£m	£m	£m
Trade receivables	60.6	55.1	-	-
Less provision for impairment of receivables	(1.8)	(2.1)	-	-
Trade receivables - net	58.8	53.0	-	-
Amounts recoverable on contracts (Note 20)	59.0	47.3	-	-
Amounts owed by Group undertakings	-	-	104.1	91.2
Prepayments and accrued income	9.7	6.1	1.0	0.7
Other receivables*	10.1	7.9	0.1	0.1
<b>At 30 June</b>	<b>137.6</b>	<b>114.3</b>	<b>105.2</b>	<b>92.0</b>

	Group		Company	
	2017	2016	2017	2016
	£m	£m	£m	£m
Trade and other receivables analysis by category				
Current assets*	137.6	114.3	105.2	92.0
<b>At 30 June</b>	<b>137.6</b>	<b>114.3</b>	<b>105.2</b>	<b>92.0</b>

(\* As set out in more detail in Note 1(i), the prior year classification of the Group's other receivables in respect of claims under the Research & Development Expenditure Credit ('RDEC') scheme have been restated.

	Group		Company	
	2017	2016	2017	2016
	£m	£m	£m	£m
Provision for impairment of trade receivables				
At 1 July	(2.1)	(0.6)	-	-
Arising on acquisition	-	(0.8)	-	-
Income statement charge	(0.2)	(0.8)	-	-
Amounts utilised	0.5	0.1	-	-
<b>At 30 June</b>	<b>(1.8)</b>	<b>(2.1)</b>	<b>-</b>	<b>-</b>

In respect of the Company, £10.4m (2016: £7.0m) of the amounts owed by Group undertakings are due for repayment within the next 12 months and the remaining £93.7m (2016: £84.2m) has no fixed repayment date. £82.7m (2016: £73.2m) of the amounts owed by Group undertakings carry interest at rates between 2.3% and 5.0% (2016: 2.3% and 5.0%) with the remaining £21.4m (2016: £18.0m) being interest-free. All amounts owed by Group undertakings are unsecured.

The provision for impairment of receivables has been calculated based on past experience and is in relation to specific customers.

## 19 Non-current assets held for sale

	2017	2016
	£m	£m
Non-current assets classified as held for sale		
Property, plant and equipment (Note 15)	2.8	-
<b>At 30 June</b>	<b>2.8</b>	<b>-</b>

In March 2017, the Directors made the decision to sell the test cell facilities and related equipment situated at the Group's Chicago Technical Centre. The assets are presented within total assets of the Technical Consulting segment in Note 2.

## 20 Contracts in progress

	2017	2016
	£m	£m
Group		
Amounts due from contract customers:		
Amounts expected to be recovered within 12 months (Note 18)	59.0	47.3
Amounts due to contract customers:		
Amounts expected to be settled within 12 months (Note 21)	(24.1)	(16.3)
<b>Net amounts due from contract customers at 30 June</b>	<b>34.9</b>	<b>31.0</b>
Analysed as:		
Contract costs incurred plus recognised profits less recognised losses to date	529.4	487.8
Less progress billings	(494.5)	(456.8)
<b>Contracts in progress at 30 June</b>	<b>34.9</b>	<b>31.0</b>
<b>IAS 11 contract revenue</b>	<b>279.9</b>	<b>262.2</b>

## 21 Trade and other payables

	Group		Company	
	2017	2016	2017	2016
	£m	£m	£m	£m
Trade payables	18.3	18.2	0.7	1.2
Tax and social security payable	9.1	8.4	1.6	1.1
Amounts owed to Group undertakings	-	-	60.8	18.1
Accruals and deferred income	25.8	25.4	2.3	2.3
Payments received in advance on contracts (Note 20)	24.1	16.3	-	-
Other payables	4.8	4.2	1.3	0.8
<b>At 30 June</b>	<b>82.1</b>	<b>72.5</b>	<b>66.7</b>	<b>23.5</b>

In respect of the Company, £7.7m (2016: £3.2m) of the amounts owed to Group undertakings are due for repayment within the next 12 months and the remaining £53.1m (2016: £14.9m) has no fixed repayment date. £53.1m (2016: £15.1m) of the amounts owed to Group undertakings carry interest at rates between 2.4% and 3.1% (2016: 2.4% and 3.1%) with the remaining £7.7m (2016: £3.0m) being interest-free. All amounts owed to Group undertakings are unsecured.

## 22 Borrowings

	Group		Company	
	2017	2016	2017	2016
	£m	£m	£m	£m
Bank overdrafts	5.9	3.3	5.9	3.3
Current other loans	0.1	0.1	0.1	0.1
Non-current bank loans	59.8	54.7	19.8	14.7
<b>At 30 June</b>	<b>65.8</b>	<b>58.1</b>	<b>25.8</b>	<b>18.1</b>

The non-current bank loans are repayable in the year ending 30 June 2020 and are denominated in Pounds Sterling. The non-current bank loans have variable rates of interest which are dependent upon the leverage of the Group and range from 1.6% to 2.35% above LIBOR. Leverage is defined as being net debt as a proportion of EBITDA. EBITDA is defined as being operating profit before interest, tax, depreciation and amortisation. At the reporting date, the Group was paying interest at the 2nd tier rate of LIBOR + 1.85%. The Group's leverage at the reporting date will qualify to attract the lowest rate of interest, being LIBOR + 1.6%.

The Group has banking facilities for its UK companies which together have a net overdraft limit. The balances are shown gross in the financial statements as cash and cash equivalents and borrowings.

### 23 Fair value of financial assets and liabilities

There are no differences between the fair value of financial assets and liabilities and their carrying value:

	Group		Company	
	2017 £m	2016 £m	2017 £m	2016 £m
<b>Assets as per Statements of Financial Position</b>				
Loans and receivables:				
Trade and other receivables <sup>(1)</sup> (Note 18)	127.9	108.2	0.1	0.1
Amounts owed by Group undertakings (Note 18)	-	-	104.1	91.2
Cash and cash equivalents (Note 34)	27.9	23.7	0.9	0.1
Assets at fair value through profit and loss:				
Derivative financial assets	0.9	0.4	0.9	0.4
<b>At 30 June</b>	<b>156.7</b>	<b>132.3</b>	<b>106.0</b>	<b>91.8</b>
<b>Liabilities as per Statements of Financial Position</b>				
Other financial liabilities at amortised cost:				
Borrowings (Note 22)	65.8	58.1	25.8	18.1
Trade and other payables <sup>(2)</sup> (Note 21)	73.0	64.1	4.3	4.3
Amounts owed to Group undertakings (Note 21)	-	-	60.8	18.1
Liabilities at fair value through profit and loss:				
Derivative financial liabilities	0.7	2.5	0.7	2.5
<b>At 30 June</b>	<b>139.5</b>	<b>124.7</b>	<b>91.6</b>	<b>43.0</b>

(\*) As set out in more detail in Note 1(l), the prior year classification of the Group's trade and other receivables in respect of claims under the Research & Development Expenditure Credit ('RDEC') scheme have been restated.

(1) Excludes prepayments and accrued income of £9.7m (2016: £6.1m) for the Group and £1.0m (2016: £0.7m) for the Company.

(2) Excludes tax and social security payable of £9.1m (2016: £8.4m) for the Group and £1.6m (2016: £1.1m) for the Company.

Net derivative financial assets of £0.2m (2016: net derivative financial liabilities of £2.1m) relate to foreign exchange contracts.

#### Summary of methods and assumptions

##### Short-term borrowings and deposits:

The fair value of short-term deposits, loans and overdrafts approximates to the carrying amount because of the short maturity of these instruments.

##### Long-term borrowings:

The fair value of borrowings approximates to the carrying value in the Statement of Financial Position as they are primarily floating rate loans where payments are reset to market rates at regular intervals.

##### Derivatives:

Derivative financial instruments are initially recognised and measured at fair value on the date a derivative contract is entered into and subsequently measured at fair value. Fair value is estimated by discounting expected future contractual cash flows using prevailing interest rate curves. Amounts denominated in foreign currencies are valued at the exchange rate prevailing at the reporting date (Level 2 under the IFRS 13 fair value hierarchy).

During the year the following foreign exchange differences were credited/(charged) to the Consolidated Income Statement:

	2017 £m	2016 £m
On loans and receivables	(0.3)	5.6
On other financial assets and liabilities	2.2	(4.6)
<b>At 30 June</b>	<b>1.9</b>	<b>1.0</b>



## 24 Financial risks

### (a) Objectives, policies and strategies

The financial risks faced by the Group and the Company comprise capital risk, liquidity risk, credit risk and market risk (comprising interest rate risk and foreign exchange risk). The Board reviews and agrees policies for managing each of these risks. The Group and the Company have no material exposure to commodity price fluctuations and this situation is not expected to change in the foreseeable future.

The Group's financial instruments comprise floating rate borrowings, the main purpose of which is to raise finance for the Group's operations and foreign exchange contracts used to manage currency risks. The Company's financial instruments comprise floating rate borrowings.

### (b) Capital risk

The objectives when managing capital are to safeguard the ability to continue as a going concern in order to provide returns for shareholders and benefits for other stakeholders and to maintain an optimal capital structure to reduce the cost of capital.

Capital is monitored on the basis of the gearing ratio. This ratio is calculated as net debt divided by total capital. Net debt is calculated as borrowings less cash and cash equivalents. Total capital is calculated as equity as shown in the Statement of Financial Position, plus net debt.

	Group		Company	
	2017	2016	2017	2016
	£m	£m	£m	£m
Gearing ratio				
Net debt (Note 34)	37.9	34.4	24.9	18.0
Total equity	155.7	139.5	107.2	116.9
Total capital	193.6	173.9	132.1	134.9
<b>At 30 June</b>	<b>19.6%</b>	<b>19.8%</b>	<b>18.8%</b>	<b>13.3%</b>

### (c) Liquidity risk

The Group and Company policy towards managing their liquidity risks is to maintain a mix of short- and medium-term borrowing facilities with their bankers. Short-term flexibility is provided by bank overdraft facilities. In addition, the Group and Company maintain medium-term borrowing facilities in order to provide the appropriate level of finance to support the current and future requirements. As the cash profile on large contracts can vary significantly, the Group seeks committed facilities that provide substantial headroom against forecast requirements to mitigate its exposure.

At the year-end, the Group held total facilities of £91.1m (2016: £90.9m). This included committed facilities of £75.0m (2016: £75.0m). £59.7m of committed facilities were drawn at 30 June 2017 (2016: £54.5m), net of direct issue costs. Committed facilities were primarily drawn to fund acquisitions. Of the committed facilities, a £35.0m facility is available for the period to September 2019 and a £40.0m facility is available until April 2020. In addition, the Group has uncommitted facilities including overdrafts of £16.1m at 30 June 2017 (2016: £15.9m), which mature throughout the next financial year and are renewable annually.

	Group		Company	
	2017	2016	2017	2016
	£m	£m	£m	£m
Maturity of borrowings				
Overdrafts repayable on demand	(5.9)	(3.3)	(5.9)	(3.3)
Maturing:				
After 1 month and within 3 months	(0.1)	(0.1)	(0.1)	(0.1)
After 12 months and within 5 years	(59.8)	(54.7)	(19.8)	(14.7)
<b>At 30 June</b>	<b>(65.8)</b>	<b>(58.1)</b>	<b>(25.8)</b>	<b>(18.1)</b>

	Group		Company	
	2017	2016	2017	2016
	£m	£m	£m	£m
Maturity of trade payables				
Maturing:				
Within 1 month	(8.7)	(9.9)	(0.5)	(1.2)
After 1 month and within 3 months	(9.0)	(7.6)	-	-
After 3 months and within 12 months	(0.5)	(0.4)	(0.2)	-
After more than 12 months	(0.1)	(0.3)	-	-
<b>At 30 June</b>	<b>(18.3)</b>	<b>(18.2)</b>	<b>(0.7)</b>	<b>(1.2)</b>

## 24 Financial risks (continued)

## (d) Credit risk

The Group is exposed to credit risk in respect of its trade receivables, which are stated net of provision for impairment. Exposure to this risk is mitigated by careful evaluation of the granting of credit and the use of credit insurance where practicable.

Concentrations of credit risk with respect to trade receivables are limited due to the Group's customer base being large and unrelated.

	2017	2016
	£m	£m
Ageing of net trade receivables		
Not overdue and not impaired	44.0	39.7
Overdue but not impaired:		
0 - 90 days overdue	11.6	9.0
91 - 180 days overdue	0.6	2.8
Over 180 days overdue	2.6	1.5
<b>At 30 June</b>	<b>58.8</b>	<b>53.0</b>

The Group's customers include the world's major transportation original equipment manufacturers and operators, supply chain organisations, energy companies, financial institutions and government agencies. Revenue by customer location is disclosed within Note 3(b) and trade receivables are derived from these customer groups and locations.

Net trade receivables that are neither past due nor impaired of £44.0m (2016: £39.7m) consist of £33.7m (2016: £26.6m) relating to the UK business, £1.9m (2016: £4.6m) relating to the European business, £4.0m (2016: £4.1m) relating to the US business, £2.9m (2016: £4.3m) relating to the Asian business and £1.5m (2016: £0.1m) relating to the business in the Middle East. Net trade receivables that are overdue but not impaired of £14.8m (2016: £13.3m) consist of £6.4m (2016: £7.7m) relating to the UK business, £1.1m (2016: £2.6m) relating to the European business, £3.6m (2016: £2.4m) relating to the US business, £1.9m (2016: £0.4m) relating to the Asian business and £1.8m (2016: £0.2m) relating to the business in the Middle East.

We have limited experience of bad debts with any of these customers. £23.1m of the total net trade receivables balance was received in July 2017. Due to these factors, the Directors are of the opinion that there is no further credit risk provision required in excess of any existing provision for impairment.

	Group		Company	
	2017	2016	2017	2016
	£m	£m	£m	£m
Maximum exposure to bank counterparty risk				
Cash at bank and in hand	27.9	23.7	0.9	0.1
Derivative financial assets	0.9	0.4	0.9	0.4
<b>At 30 June</b>	<b>28.8</b>	<b>24.1</b>	<b>1.8</b>	<b>0.5</b>

Cash at bank and in hand of £27.9m (2016: £23.7m) consists of £9.0m (2016: £4.1m) held in the UK, £4.3m (2016: £5.0m) held in Europe, £1.2m (2016: £3.3m) held in the US, £12.9m (2016: £8.1m) held in Asia and £0.5m (2016: £3.2m) held in the Middle East.

The Group and Company is exposed to bank credit risk in respect of money held on deposit and certain derivative transactions entered into with banks. Exposure to this form of risk is mitigated as material transactions are only undertaken with bank counterparties that have high credit ratings assigned by international credit-rating agencies. The Group and Company further limits risk in this area by setting an overall credit limit for all transactions with each bank counterparty in accordance with the institution's credit standing.

## (e) Market risk

## Interest rate risk

The Group and Company borrowings and cash balances held at floating interest rates are exposed to cash flow interest rate risk. As set out in further detail in Note 22, the exposure to interest rate movements is not currently hedged as the variable rates of interest are largely dependent upon the leverage of the Group, which is currently attracting the lowest possible rate of interest. The effect of any foreseen changes in the LIBOR remain unhedged, although the policy is reviewed on an ongoing basis.

	Group		Company	
	2017	2016	2017	2016
	£m	£m	£m	£m
Financial assets and liabilities by interest type				
Floating rate financial assets	12.9	8.1	82.7	70.8
No interest financial assets*	143.8	124.3	26.9	21.1
Floating rate financial liabilities	(59.8)	(54.5)	(72.9)	(29.6)
No interest financial liabilities	(79.7)	(70.3)	(22.3)	(13.5)
<b>Net financial assets at 30 June</b>	<b>17.2</b>	<b>7.6</b>	<b>14.4</b>	<b>48.8</b>

(\*) As set out in more detail in Note 1(l), the prior year classification of the Group's financial assets which attract no interest in respect of claims under the Research & Development Expenditure Credit ("RDEC") scheme have been restated.

**24 Financial risks (continued)****(e) Market risk (continued)***Foreign exchange risk*

The Group faces currency exposures on trading transactions undertaken by its subsidiaries in foreign currencies and balances arising therefrom, and on the translation of profits earned in, and net assets of, overseas subsidiaries, primarily in the US, Netherlands, Germany and China.

The carrying amounts of the Group's foreign currency denominated monetary assets and liabilities are:

	Assets		Liabilities	
	2017 £m	2016 £m	2017 £m	2016 £m
US Dollar	13.3	9.7	(1.3)	(1.5)
Euro	13.2	11.9	(11.6)	(5.2)
Chinese Renminbi	13.3	8.7	(0.4)	(0.1)

It is the Group's policy not to undertake any speculative currency transactions.

The Group hedges transactional exposures relating to its foreign currency exposures on contracts by taking out foreign exchange contracts or other derivative financial instruments.

The Company hedges currency risk on its US Dollar, Euro and Chinese Renminbi denominated receivables from related parties.

**(f) Analysis of sensitivity of financial instruments to market risk***Exchange rate sensitivity*

The Group has financial instruments in assets and liabilities in foreign currencies, principally in US Dollars, Euros and Chinese Renminbi, where the financial instruments are not in the functional currency of the entity that holds them. A 20% change in the value of the US Dollar, Euro or Chinese Renminbi would have an insignificant impact on the value of financial instruments at the year-end. Given the relative strengthening of the Group's principal foreign currencies against the Pound Sterling in the financial year following the result of the UK referendum vote to leave the EU, a 20% sensitivity in these exchange rates is deemed to be appropriate.

*Interest rate sensitivity*

A 1% change in either the US Dollar, Euro, Chinese Renminbi or Sterling interest rates would have an insignificant impact on the value of the Group's floating rate financial instruments at the year-end. A 1% sensitivity is deemed to be appropriate as loans are based on LIBOR and so are unlikely to be subjected to significant fluctuations in interest rates in the foreseeable future.

**(g) Cash flow hedges**

The Group uses foreign currency contracts designated as cash flow hedges to hedge the exposure arising from orders in foreign currencies that could affect the Consolidated Income Statement. The principal risk being hedged is the Euro/Sterling, US Dollar/Sterling and Chinese Renminbi/Sterling spot and interest rate differential exchange rate risk arising from orders in foreign currencies. The spot and interest rate differential component of the contracts taken out is designated as a hedge of the change in fair value of the cash flows on the firm orders in foreign currencies that are attributable to movements in the Euro/Sterling, US Dollar/Sterling and Chinese Renminbi/Sterling spot and interest rates. Since the Group does not hedge account, any change in the fair value of the instrument is recognised directly in the Consolidated Income Statement.

	2017 £m	2016 £m
Cash flows expected to occur and affect the income statement		
Within 3 months	47.9	29.3
After 3 months and within 12 months	0.1	1.4
After 1 and within 3 years	-	0.2
<b>Total</b>	<b>48.0</b>	<b>30.9</b>



## 25 Retirement benefit obligations

### Group and Company

#### Defined contribution and defined benefit schemes

The Group operates various defined contribution pension schemes, the assets of which are held in separately administered funds. The Group also operates a defined benefit pension scheme, the Ricardo Group Pension Fund ('RGPF'), which closed to future accrual on 28 February 2010. Responsibility for the governance of the RGPF lies with the Board of Trustees. The Board of Trustees must be comprised of representatives of the Group and RGPF participants in accordance with the RGPF's regulations.

The last triennial valuation of the RGPF was completed with an effective date of 5 April 2014. At that date, the assets of the fund had a market value of £96.3m and were sufficient to cover 79% of the benefits that had accrued to members when assessed on the Trustees' prudent funding basis. Contributions due to the RGPF during the year ending 30 June 2017 are £4.3m. The Company has agreed with the Trustees that the annual contributions of £4.3m will continue until 31 January 2021, in order to eliminate the Trustees' funding deficit revealed at the 5 April 2014 valuation. The next triennial valuation was on 5 April 2017, and this process is expected to complete in the year ending 30 June 2018. The results of the 2017 triennial valuation will determine whether the Group's current contribution commitment remains appropriate.

The IAS 19 'Employee Benefits' valuation was completed as at 30 June 2017 and the pension costs relating to the RGPF were assessed using the projected unit credit method in accordance with the advice of Mercer, qualified actuaries. The post-retirement mortality assumptions for the current year have been reviewed. The use of a standard baseline by SAPS, known as the 'Series 2' tables, with a 98% multiplier for males and 95% multiplier for females is consistent with the prior year. The future improvements component has been updated to be in line with the Continuous Mortality Investigation ('CMI') 2016 projection model. The use of a 1.25% long-term trend (based upon each member's year of birth) is consistent with the prior year. Under these mortality assumptions the expected future lifetime from age 65 is:

Age	2017		2016	
	Males	Females	Males	Females
65 now	23.4	24.6	23.8	25.2
65 in 20 years	24.7	26.1	25.4	27.1

The other significant assumptions made were:

	At 30 June 2017	At 30 June 2016
Discount rate	2.60%	2.95%
Inflation	3.20%	2.80%
Rate of increase in pensions in payment:		
Pre 1 July 2002 accrual	3.60%	3.45%
Post 1 July 2002 accrual	3.15%	2.75%
Rate of increase in pension in deferment	2.20%	1.80%
Percentage of pension to be commuted for a lump sum at retirement	25.00%	25.00%

Scheme assets are comprised as follows:

	2017			2016		
	Quoted £m	Unquoted £m	Total £m	Quoted £m	Unquoted £m	Total £m
Equities	33.6	-	33.6	27.8	-	27.8
Bonds	56.9	-	56.9	63.1	-	63.1
Cash	-	13.3	13.3	-	5.8	5.8
Property	-	7.0	7.0	-	6.7	6.7
Diversified growth funds	20.2	-	20.2	19.4	-	19.4
<b>At 30 June</b>	<b>110.7</b>	<b>20.3</b>	<b>131.0</b>	<b>110.3</b>	<b>12.5</b>	<b>122.8</b>

## 25 Retirement benefit obligations (continued)

Movements in the fair value of scheme assets and present value of defined benefit obligations were as follows:

	2017			2016		
	Fair value of plan assets	Present value of obligation	Net total	Fair value of plan assets	Present value of obligation	Net total
	£m	£m	£m	£m	£m	£m
At 1 July	122.8	(144.3)	(21.5)	109.4	(130.1)	(20.7)
Interest income/(expense) (Note 8)	3.6	(4.2)	(0.6)	4.2	(4.9)	(0.7)
Credit/(charge) to the income statement	3.6	(4.2)	(0.6)	4.2	(4.9)	(0.7)
Return on plan assets, excluding amounts included in interest income	6.9	-	6.9	9.7	-	9.7
Gain from change in demographic assumptions	-	4.5	4.5	-	-	-
Loss from change in financial assumptions	-	(15.8)	(15.8)	-	(14.1)	(14.1)
Total remeasurements in other comprehensive income	6.9	(11.3)	(4.4)	9.7	(14.1)	(4.4)
Contributions from sponsoring companies	4.3	-	4.3	4.3	-	4.3
Benefits paid	(6.6)	6.6	-	(4.8)	4.8	-
Total movements	8.2	(8.9)	(0.7)	13.4	(14.2)	(0.8)
<b>At 30 June</b>	<b>131.0</b>	<b>(153.2)</b>	<b>(22.2)</b>	<b>122.8</b>	<b>(144.3)</b>	<b>(21.5)</b>

The sensitivity of the defined benefit obligation to changes in the principal assumptions is:	Change in assumption	Impact on defined benefit obligation
Decrease in discount rate	0.25%	Increase by £7.1m
Increase in inflation rate	0.25%	Increase by £4.3m
Increase in life expectancy	1 year	Increase by £5.6m

The above sensitivity analyses are based on a change in an assumption while holding all other assumptions constant. In practice this is unlikely to occur and changes in some of the assumptions may be correlated. When calculating the sensitivity of the defined benefit obligation to significant actuarial assumptions, the same method has been applied as when calculating the pension liability recognised within the Statement of Financial Position. The methods and types of assumptions used in preparing the sensitivity analysis did not change when compared to the previous year.

The Group is exposed to a number of risks from the RGPF, the most significant of which are described below:

Asset volatility:	The RGPF liabilities are calculated using a discount rate set with reference to corporate bond yields. If the RGPF assets underperform this yield, the deficit will increase. The RGPF holds a significant proportion of equities and diversified growth funds, which are expected to outperform corporate bonds in the long-term while providing volatility and risk in the short-term. The Directors are of the view that due to the long-term nature of the RGPF liabilities and the strength of the supporting Group, this is an appropriate strategy to manage the RGPF efficiently.
Changes in corporate bond yields:	A decrease in corporate bond yields will increase RGPF liabilities, although this will be partially offset by an increase in the value of the RGPF's bond holdings. The UK referendum vote to leave the EU in 2016 has caused volatility in the market which has, and may continue to, adversely affect corporate bond yields, with a corresponding impact on discount rates as described above.
Inflation risk:	Although there are some caps in place to protect the RGPF against extreme inflation, increases in the level of inflation will lead to higher liabilities.
Life expectancy:	The RGPF provides benefits for the life of the members, therefore increases in the life expectancy will result in an increase in the RGPF's liabilities.

The weighted average duration of the defined benefit obligation is 18.1 years.

	2017	2016
	£m	£m
Expected maturity analysis of undiscounted pension benefits:		
Less than a year	4.0	3.9
Between 1-2 years	4.2	4.0
Between 2-5 years	13.4	12.8
Next 5 years	25.4	24.2
	2017	2016
	£m	£m
Amounts charged in the income statement in respect of pensions		
In respect of defined contribution schemes	9.1	8.7
In respect of defined benefit schemes	0.6	0.7
<b>Total</b>	<b>9.7</b>	<b>9.4</b>
Included within:		
Staff costs (Note 7)	9.1	8.7
Finance costs (Note 8)	0.6	0.7
<b>Total</b>	<b>9.7</b>	<b>9.4</b>

## 26 Deferred tax

## (a) Deferred tax analysis by category

	Group		Company	
	2017 £m	2016 £m	2017 £m	2016 £m
Non-current deferred tax assets	14.3	13.0	4.8	5.7
Non-current deferred tax liabilities	(5.0)	(3.6)	(0.1)	(0.5)
<b>Net deferred tax asset at 30 June</b>	<b>9.3</b>	<b>9.4</b>	<b>4.7</b>	<b>5.2</b>

## (b) Movements in net deferred tax assets and liabilities

	Accelerated capital allowances	Retirement benefit obligations	Tax losses and credits	Unrealised capital gains	Other	Total
Group	£m	£m	£m	£m	£m	£m
At 1 July 2015	(4.1)	4.1	8.8	(0.5)	2.3	10.6
Arising on acquisition	-	-	-	-	(3.3)	(3.3)
(Charged)/credited to the income statement	(0.3)	(0.8)	0.1	-	1.1	0.1
Credited to statement of comprehensive income	-	0.7	-	-	-	0.7
Credited directly to equity	-	-	-	-	0.2	0.2
Exchange rate adjustments	(0.3)	-	1.5	-	(0.1)	1.1
At 30 June 2016	(4.7)	4.0	10.4	(0.5)	0.2	9.4
Arising on acquisition	-	-	-	-	(0.1)	(0.1)
Credited/(charged) to the income statement	0.2	(0.7)	(1.5)	0.1	0.7	(1.2)
Credited to statement of comprehensive income	-	0.8	-	-	-	0.8
Credited directly to equity	-	-	-	-	0.1	0.1
Exchange rate adjustments	(0.1)	-	0.4	-	-	0.3
<b>At 30 June 2017</b>	<b>(4.6)</b>	<b>4.1</b>	<b>9.3</b>	<b>(0.4)</b>	<b>0.9</b>	<b>9.3</b>

At 30 June 2017 and 30 June 2016 there were no temporary differences associated with undistributed earnings of subsidiaries for which deferred tax liabilities have been recognised. No liability would be recognised in respect of these differences because the Group is in a position to control the timing of the reversal of the temporary differences and it is probable that such differences will not reverse in the foreseeable future.

A deferred tax asset has not been recognised for the current year tax losses within the consolidated tax group controlled by Ricardo GmbH, within which Ricardo Deutschland GmbH is the primary trading entity. The deferred tax asset not recognised in respect of these losses at 30 June 2017 amounts to £6.0m (2016: £5.1m). This increase is primarily as a result of a reduction in the recognised carrying value at 30 June 2017 of the deferred tax asset in the consolidated tax group controlled by Ricardo GmbH, which is currently £2.4m (2016: £3.6m). The Directors have derecognised £1.5m in the year to reflect their assessment as to the extent of future taxable profits that will be available within the consolidated tax group controlled by Ricardo GmbH against which the carrying value of the recognised deferred tax asset can be utilised in the foreseeable future.

A deferred tax asset also continues to be recognised within the consolidated tax group controlled by Ricardo, Inc. in respect of historic research and development claims that can be utilised against future taxable profits. These claims carry a 20-year statute of limitation and must be utilised within that period. The carrying value at 30 June 2017 for the deferred tax asset in the consolidated tax group controlled by Ricardo, Inc. that has been recognised is £5.9m (2016: £4.9m). The Directors have performed an assessment and consider that it is probable that future taxable profits will be available within the consolidated tax group controlled by Ricardo, Inc. against which the carrying value of the recognised deferred tax asset can be utilised in the foreseeable future.

	Retirement benefit obligations	Tax losses and credits	Unrealised capital gains	Other	Total
Company	£m	£m	£m	£m	£m
At 1 July 2015	4.1	(0.1)	(0.5)	1.4	4.9
(Charged)/credited to the income statement	(0.8)	0.3	-	(0.1)	(0.6)
Credited to statement of comprehensive income	0.7	-	-	-	0.7
Credited directly to equity	-	-	-	0.2	0.2
At 30 June 2016	4.0	0.2	(0.5)	1.5	5.2
(Charged)/credited to the income statement	(0.7)	-	-	(0.7)	(1.4)
Credited to statement of comprehensive income	0.8	-	-	-	0.8
Credited directly to equity	-	-	-	0.1	0.1
<b>At 30 June 2017</b>	<b>4.1</b>	<b>0.2</b>	<b>(0.5)</b>	<b>0.9</b>	<b>4.7</b>



## 27 Provisions

Group	Warranty £m	Dilapidation £m	Other £m	Total £m
At 1 July 2015	1.2	0.3	0.2	1.7
Arising on acquisition	-	-	0.5	0.5
Charged to income statement	1.0	-	0.9	1.9
Utilised in year	(0.6)	-	(0.3)	(0.9)
Released in year	(0.3)	(0.1)	(0.1)	(0.5)
Exchange rate adjustments	-	-	0.1	0.1
At 30 June 2016	1.3	0.2	1.3	2.8
Arising on acquisition	-	-	0.1	0.1
Charged to income statement	1.0	-	0.3	1.3
Utilised in year	(0.6)	-	(0.2)	(0.8)
Released in year	(0.1)	(0.2)	(0.5)	(0.8)
<b>At 30 June 2017</b>	<b>1.6</b>	<b>-</b>	<b>1.0</b>	<b>2.6</b>

The warranty provision reflects the Directors' best estimate of the cost needed to fulfil the Group's warranty obligations within a number of contracts. Subsequent to their initial recognition, warranty provisions unwind over the periods of the warranty obligations, which are expected to be less than five years.

The dilapidation provision reflects the Directors' best estimate of future obligations relating to the maintenance of leasehold properties arising from past events such as lease renewals or terminations. The timing of the cash flows is dependent upon the remaining term of the associated lease.

Other provisions comprise those for claims, litigation, restructuring costs and statutory provisions for employment-related benefits, including long-service awards and termination indemnity schemes. The associated cash outflows for claims, litigation and restructuring costs are primarily less than one year, whilst the cash outflows associated with statutory employment-related benefits are expected to be more than five years.

	2017 £m	2016 £m
Analysis of total provisions		
Current	1.3	1.3
Non-current	1.3	1.5
<b>At 30 June</b>	<b>2.6</b>	<b>2.8</b>

## 28 Share capital

Group and Company	2017 Number	2016 Number	2017 £m	2016 £m
Allotted, called-up and fully paid ordinary shares of 25p each				
At 1 July	52,854,823	52,417,047	13.2	13.1
Allotted under the LTIP scheme	186,779	325,866	0.1	0.1
Allotted under the DBP scheme	121,788	111,910	-	-
Remaining in EBT	33	-	-	-
<b>At 30 June</b>	<b>53,163,423</b>	<b>52,854,823</b>	<b>13.3</b>	<b>13.2</b>

The consideration received for shares allotted under the share option schemes, Long-Term Incentive Plan ('LTIP') and Deferred Share Bonus Plan ('DBP') during the year ended 30 June 2017 was £0.1m (2016: £0.1m).

Dividends were paid at the reduced rate of 0.01p per share for interim and final dividends in respect of shares held by an Employee Benefit Trust ('EBT') in relation to the LTIP. There were 2,813 such shares at 30 June 2017 (2016: 2,780 shares).

## 29 Share premium

Group and Company	£m
<b>At 1 July 2015, 30 June 2016 and 30 June 2017</b>	<b>14.3</b>

### 30 Share-based payments

The Group operates the following share-based payment schemes: 2004 Ricardo plc Executive Share Option Plan (the '2004 Plan'); equity-settled and cash-settled Long-Term Incentive Plan ('LTIP'); Deferred Share Bonus Plan ('DBP') and equity-settled all-employee Share Incentive Plan ('SIP').

The general terms and conditions, including vesting requirements and performance conditions for the 2004 Plan, equity-settled LTIP, DBP and equity-settled SIP are described in the Directors' Remuneration Report.

The 2004 Plan, LTIP, DBP and SIP require shareholder approval for the issue of shares. There were no awards outstanding in relation to the SIP at the year-end. 50% of awards granted under the LTIP and DBP Matching Awards are dependent on a Total Shareholder Return ('TSR') performance condition. As relative TSR is defined as a market condition under IFRS 2, this requires that the valuation model used takes into account the anticipated performance outcome. The TSR element of the charge to the Consolidated Income Statement has been calculated using the Monte Carlo model and the earnings per share ('EPS') element has been calculated using the Black Scholes model. The following assumptions are used for the plan cycles commencing in these years:

	2017	2016
Weighted average share price at date of award	<b>929p</b>	920p
Expected volatility	<b>25.4%</b>	23.8%
Expected life	<b>3 yrs</b>	3 yrs
Risk-free rate	<b>0.2%</b>	0.8%
Dividend yield	<b>2.0%</b>	2.0%
Possibility of ceasing employment before vesting	<b>10%</b>	10%
Weighted average fair value per LTIP as a percentage of a share at date of award	<b>74.8%</b>	76.6%

Expected volatility was determined by calculating the historical volatility of the Company's share price over the three financial years preceding the date of award.

The share-based payments charge of £1.6m (2016: £1.5m) disclosed in Note 7 comprised £1.6m (2016: £1.5m) in respect of equity-settled schemes and £Nil (2016: £Nil) in respect of cash-settled schemes.

#### Equity-settled Executive Share Option Plan

	2017		2016	
	Number	Weighted average share price	Number	Weighted average share price
Outstanding at 1 July	<b>2,827</b>	<b>305p</b>	2,827	305p
Exercised	-	<b>305p</b>	-	305p
<b>Outstanding at 30 June</b>	<b>2,827</b>	<b>305p</b>	2,827	305p
Exercisable at the end of the year	<b>2,827</b>	<b>305p</b>	2,827	305p

The outstanding options had a weighted average contractual life of 1.3 years (2016: 2.3 years). The remaining options are exercisable at 305p. During the years ended 30 June 2017 and 30 June 2016, no equity-settled executive share options were awarded.

#### Equity-settled Long-Term Incentive Plan

The current LTIP is described in the Directors' Remuneration Report. Awards are forfeited if the employee leaves the Group before the awards vest, unless they are considered 'good leavers'.

	2017	2016
	Shares allocated <sup>(1)</sup>	Shares allocated <sup>(1)</sup>
Outstanding at 1 July	<b>586,232</b>	663,718
Awarded	<b>226,591</b>	206,796
Lapsed	<b>(30,285)</b>	(16,685)
Forfeited	-	(2,551)
Vested	<b>(186,779)</b>	(265,046)
<b>Outstanding at 30 June</b>	<b>595,759</b>	586,232

(1) Shares allocated excludes dividend roll-up.

The outstanding LTIP awards had a weighted average contractual life of 1.4 years (2016: 1.3 years). The weighted average exercise price in both 2017 and 2016 was £Nil.

### 30 Share-based payments (continued)

#### Cash-settled Long-Term Incentive Plan

The cash-settled LTIP has the same performance conditions as the equity-settled LTIP but the award is settled in cash rather than share issue.

	2017 Shares allocated <sup>(1)</sup>	2016 Shares allocated <sup>(1)</sup>
Outstanding at 1 July	4,759	-
Awarded	6,000	5,898
Forfeited	-	(1,139)
<b>Outstanding at 30 June</b>	<b>10,759</b>	<b>4,759</b>

(1) Shares allocated excludes dividend roll-up.

The outstanding LTIP awards had a weighted average contractual life of 1.9 years (2016: 2.3 years). The weighted average exercise price in both 2017 and 2016 was £Nil.

#### Deferred Share Bonus Plan

The Deferred Share Bonus Plan is described in the Directors' Remuneration Report.

	2017 Number of deferred shares	2016 Number of deferred shares
Outstanding at 1 July	260,116	343,187
Awarded	90,784	89,600
Forfeited	(1,134)	(3,744)
Dividend shares awarded in the year	2,493	4,247
Vested	(121,788)	(173,174)
<b>Outstanding at 30 June</b>	<b>230,471</b>	<b>260,116</b>

The outstanding deferred bonus plans had a weighted average contractual life of 1.3 years (2016: 1.1 years). The weighted average exercise price in both 2017 and 2016 was £Nil.

### 31 Other reserves

Group	Merger reserve £m	Translation reserve £m	Total £m
At 1 July 2015	1.0	2.9	3.9
Exchange rate adjustments	-	8.7	8.7
At 30 June 2016	1.0	11.6	12.6
Exchange rate adjustments	-	3.0	3.0
<b>At 30 June 2017</b>	<b>1.0</b>	<b>14.6</b>	<b>15.6</b>

The merger reserve represents the amount by which the fair value of the shares issued as consideration for acquisitions exceeded their nominal value, offset by the goodwill on these acquisitions.

The translation reserve comprises foreign currency differences arising from the translation of financial statements of foreign operations.



## 32 Retained earnings

	Group £m	Company £m
At 1 July 2015	84.7	81.7
Profit for the year	25.6	18.6
Remeasurements of the defined benefit scheme	(4.4)	(4.4)
Tax on remeasurements of the defined benefit scheme	0.7	0.7
Dividends paid	(8.9)	(8.9)
Equity-settled transactions	1.5	1.5
Tax credit relating to share option schemes	0.2	0.2
<b>At 30 June 2016</b>	<b>99.4</b>	<b>89.4</b>
Profit for the year	24.8	1.9
Remeasurements of the defined benefit scheme	(4.4)	(4.4)
Tax on remeasurements of the defined benefit scheme	0.8	0.8
Dividends paid	(9.8)	(9.8)
Equity-settled transactions	1.6	1.6
Tax credit relating to share option schemes	0.1	0.1
Reclassification of non-controlling interests	(0.3)	-
<b>At 30 June 2017</b>	<b>112.2</b>	<b>79.6</b>

## 33 Cash generated from/(used in) operations

	Note	Group		Company	
		2017 £m	2016 £m	2017 £m	2016 £m
Profit before tax		<b>32.2</b>	33.0	<b>2.7</b>	19.1
Adjustments for:					
Share-based payments	30	<b>1.6</b>	1.5	<b>1.6</b>	1.5
Cash flow hedges		<b>(3.2)</b>	2.3	<b>(3.2)</b>	2.3
Profit on disposal of property, plant and equipment		<b>(0.7)</b>	-	<b>(0.7)</b>	-
Dividends received from subsidiaries		-	-	-	(18.5)
Net finance costs/(income)	8	<b>2.5</b>	1.9	-	(0.2)
Depreciation and amortisation	14 & 15	<b>16.3</b>	13.9	<b>1.8</b>	1.8
Operating cash flows before movements in working capital*		<b>48.7</b>	52.6	<b>2.2</b>	6.0
Increase in inventories		<b>(2.9)</b>	(3.2)	-	-
Increase in trade and other receivables*		<b>(15.5)</b>	(13.1)	<b>0.6</b>	-
Decrease/(increase) in intercompany balances		-	-	<b>3.1</b>	(24.4)
Decrease in trade and other payables		<b>(1.1)</b>	(4.0)	<b>(3.2)</b>	(0.3)
(Decrease)/increase in provisions		<b>(0.5)</b>	1.1	-	-
Defined benefit payments		<b>(4.4)</b>	(4.4)	<b>(4.4)</b>	(4.4)
<b>Cash generated from/(used in) operations</b>		<b>24.3</b>	29.0	<b>(1.7)</b>	(23.1)

(\*) As set out in more detail in Note 1(l), the prior year classification of the Group's cash generated from operations in respect of claims under the Research & Development Expenditure Credit ('RDEC') scheme have been restated.

**34 Net debt**

Net debt is defined by the Group as net cash and cash equivalents less borrowings.

	Group		Company	
	2017	2016	2017	2016
	£m	£m	£m	£m
Analysis of net debt				
Cash and cash equivalents (current assets)	27.9	23.7	0.9	0.1
Bank overdrafts (current liabilities)	(5.9)	(3.3)	(5.9)	(3.3)
Net cash and cash equivalents	22.0	20.4	(5.0)	(3.2)
Borrowings maturing within one year	(0.1)	(0.1)	(0.1)	(0.1)
Borrowings maturing after one year	(59.8)	(54.7)	(19.8)	(14.7)
<b>At 30 June</b>	<b>(37.9)</b>	<b>(34.4)</b>	<b>(24.9)</b>	<b>(18.0)</b>

	Group		Company	
	2017	2016	2017	2016
	£m	£m	£m	£m
Movement in net debt				
Net (debt)/funds at start of year	(34.4)	14.3	(18.0)	(4.9)
Net increase/(decrease) in cash and cash equivalents	1.6	(39.3)	(1.8)	(3.7)
Net proceeds from borrowings	(5.1)	(9.4)	(5.1)	(9.4)
<b>At 30 June</b>	<b>(37.9)</b>	<b>(34.4)</b>	<b>(24.9)</b>	<b>(18.0)</b>

**35 Operating lease commitments**

By date of commitments:		2017	2016
Group		£m	£m
Future aggregate minimum lease payments under non-cancellable operating leases falling due:			
Within one year		7.1	7.2
Between one and five years		21.7	22.2
After five years		27.1	30.2
<b>At 30 June</b>		<b>55.9</b>	<b>59.6</b>
By nature of commitments:		2017	2016
Group		£m	£m
Future aggregate minimum lease payments under non-cancellable operating leases:			
Land and buildings		54.7	58.3
Other		1.2	1.3
<b>At 30 June</b>		<b>55.9</b>	<b>59.6</b>

**36 Contingent liabilities**

In the ordinary course of business, the Group has £7.8m (2016: £6.3m) of guarantees and counter-indemnities in respect of bonds relating to performance under contracts. The Group is also involved in commercial disputes and litigation with some customers, which is also in the normal course of business. Whilst the result of such disputes cannot be predicted with certainty, the Directors of the Company believe that the ultimate resolution of these disputes will not have a material effect on the Group's financial position or results.

In July 2013, a guarantee was provided to the Ricardo Group Pension Fund of £2.8m in respect of certain contingent liabilities that may arise, which have been secured on specific land and buildings (see Note 15). In the Directors' opinion, after taking appropriate legal advice, the outcome of this matter is not expected to give rise to any material cost to the Group.

**37 Related party transactions**

	<b>2017</b>	2016
	<b>£m</b>	£m
The Company had the following transactions with Group undertakings:		
Sale of services	<b>15.7</b>	14.4
Finance income	<b>2.3</b>	1.5
Finance costs	<b>(0.8)</b>	(0.2)
Dividend income	-	18.5
The Company had the following year-end balances with Group undertakings:		
Amounts owed by Group undertakings	<b>104.1</b>	91.2
Amounts owed to Group undertakings	<b>(60.8)</b>	(18.1)

The Chairman of Ricardo plc, Sir Terry Morgan, is also a statutory director of Crossrail Limited, which is deemed to be a related party.

	<b>2017</b>	2016
	<b>£m</b>	£m
The Group had the following transactions with Crossrail Limited:		
Sale of services	<b>1.6</b>	1.7
The Group had the following year-end balances with Crossrail Limited:		
Trade receivables	<b>0.1</b>	0.3

All transactions with Group undertakings, which are disclosed in Note 38, and other related parties as disclosed above, occurred on an arm's length basis.

Transactions with the Ricardo Group Pension Fund are disclosed in Note 25. Contributions to the Fund of £0.4m (2016: £0.4m) were owed by the Company as at the year-end.



## 38 Subsidiaries

The Company owns, directly(\*) or indirectly, 100% of the issued share capital, unless otherwise noted, of the following subsidiaries at 30 June 2017. All subsidiaries are deemed to be controlled by the Group and are therefore consolidated within these financial statements:

Subsidiary	Registered office	Principal activities
Ricardo Investments Limited*	Shoreham Technical Centre, Old Shoreham Road, Shoreham-by-Sea, West Sussex, BN43 5FG, United Kingdom†	Holding Company and Management Services
Ricardo UK Limited	Shoreham Technical Centre, Old Shoreham Road, Shoreham-by-Sea, West Sussex, BN43 5FG, United Kingdom†	Automotive Consulting, Strategic Consulting and Performance Products
Ricardo Prague s.r.o.	Palác Karlín, Thámova 11-13, 186 00 Praha 8, Czech Republic	Automotive Consulting and Software
Ricardo Italia s.r.l.	Piazza Solferino 20, 10121, Torino, Italy	Automotive Consulting and Business Development
Ricardo Motorcycle Italia s.r.l.	Via Giovanni Pascoli 47, 47853, Cerasolo, Coriano, Rimini, Italy	Automotive Consulting
Ricardo GmbH	Güglingstraße 66-70, 73529, Schwäbisch Gmünd, Germany	Holding Company
Ricardo Deutschland GmbH	Güglingstraße 66-70, 73529, Schwäbisch Gmünd, Germany	Automotive Consulting
Ricardo Strategic Consulting GmbH	Luisenstraße 14, 80333, München, Germany	Strategic Consulting
Ricardo Russia Limited	Shoreham Technical Centre, Old Shoreham Road, Shoreham-by-Sea, West Sussex, BN43 5FG, United Kingdom†	Business Development
Ricardo, Inc.	Detroit Technical Center, 40000 Ricardo Drive, Van Buren Township, Detroit, Michigan, 48111-1641, United States	Automotive Consulting, Strategic Consulting and Software
Ricardo Defense Systems LLC	Suite 200, Detroit Technical Center, 40000 Ricardo Drive, Van Buren Township, Detroit, Michigan, 48111-1641, United States	Automotive Consulting and Performance Products
Ricardo Shanghai Company Limited*	Floor 17, Phoenix Building, No. 1515 Gumei Road, Xuhui District, Shanghai, 200233, PR China	Automotive Consulting, Rail Consulting and Business Development
Ricardo India Private Limited*(1)	Plaza M6, District Centre, Jasola, Mathura Road, New Delhi, 110076, India	Business Development
Ricardo Japan K.K.	18th Floor, Shin Yokohama Square Building, 2-3-12 Shin Yokohama, Kohoku-ku, Yokohama, 222-0033, Japan	Automotive Consulting, Rail Consulting and Business Development
Ricardo Asia Limited	Shoreham Technical Centre, Shoreham-by-Sea, West Sussex, BN43 5FG, United Kingdom†	Automotive Consulting, Rail Consulting and Business Development
Ricardo-AEA Limited	Shoreham Technical Centre, Old Shoreham Road, Shoreham-by-Sea, West Sussex, BN43 5FG, United Kingdom†	Environmental Consulting
Cascade Consulting Holdings Limited	Shoreham Technical Centre, Old Shoreham Road, Shoreham-by-Sea, West Sussex, BN43 5FG, United Kingdom†	Holding Company
Cascade Consulting (Environment & Planning) Limited	Shoreham Technical Centre, Old Shoreham Road, Shoreham-by-Sea, West Sussex, BN43 5FG, United Kingdom†	Environmental Consulting
Power Planning Associates Limited	Shoreham Technical Centre, Old Shoreham Road, Shoreham-by-Sea, West Sussex, BN43 5FG, United Kingdom†	Environmental Consulting
PPA Energy (Pty) Limited	No 1 Eastgate Lane, Bedfordview, Johannesburg, Gauteng, 2007, South Africa	Environmental Consulting
Ricardo Rail Limited	Shoreham Technical Centre, Old Shoreham Road, Shoreham-by-Sea, West Sussex, BN43 5FG, United Kingdom†	Rail Consulting
Ricardo Nederland B.V.	Catharijnesingel 33, 3511 GC, Utrecht, The Netherlands	Rail Consulting
Ricardo Singapore Pte Limited	1 Fusionopolis Place, #09-11, Galaxis, 138522, Singapore	Rail Consulting
Ricardo Hong Kong Limited	Units 3211-18, 32/F Shui On Centre, 6-8 Harbour Road, Wanchai, Hong Kong	Rail Consulting
Ricardo Beijing Company Limited	Suite 709-710, CCS Mansion, 9 Dongzhimen Nan Street, Beijing, 100007, PR China	Rail Consulting
Ricardo Technical Consultancy LLC (49%)(2)	1002, Regus Al Jaidah Business Centre, 10th Floor, Al Shoumoukh Tower B, C-Ring Road, Al Sadd, PO Box 55896, Doha, Qatar	Rail Consulting
Ricardo Gulf Technical Consultancy LLC (49%)(3)	11th Floor, Office 8, MSMAC Building, Corniche Street, Abu Dhabi, United Arab Emirates	Rail Consulting
Chongqing Transportation Railway Safety Assessment Center Limited (60%)(4)	No. 2 Yangliu Road, Huangshan Avenue, New North District, Chongqing, 401123, PR China	Rail Consulting
Nanjing Delta Win Transportation Technical Services Limited (65%)(5)	Room 1101, No. 301, Zhongmen Street, Gulou District, Nanjing, Jiangsu Province, PR China	Rail Consulting
Ricardo Certification Limited	Shoreham Technical Centre, Old Shoreham Road, Shoreham-by-Sea, West Sussex, BN43 5FG, United Kingdom†	Independent Assurance
Ricardo Certification B.V.	Radboudkwartier 227, 3511 GJ, Utrecht, The Netherlands	Independent Assurance
Ricardo Certification Denmark ApS	Nørre Farimagsgade 11, 1364, Copenhagen, Denmark	Independent Assurance
Ricardo Certification Iberia SL	Calle de Agustín de Foxá 29, 9ºB, 28036, Madrid, Spain	Independent Assurance

**38 Subsidiaries (continued)**

Subsidiary	Registered office	Principal activities
Ricardo Certificacion SL	Calle de Agustín de Foxá 29, 9ºB, 28036, Madrid, Spain	Dormant
Ricardo Environment Arabia LLC <sup>(6)</sup>	C/O Clyde and Co, The Business Gate, Building 14, Office Level 1, Qurtubah District, Airport Road, PO Box 16743, Riyadh 11474, Kingdom of Saudi Arabia	Dormant
Ricardo EMEA Limited	Shoreham Technical Centre, Old Shoreham Road, Shoreham-by-Sea, West Sussex, BN43 5FG, United Kingdom†	Dormant
Ricardo Vepro Limited	Shoreham Technical Centre, Old Shoreham Road, Shoreham-by-Sea, West Sussex, BN43 5FG, United Kingdom†	Dormant
Ricardo Consulting Engineers Limited	Shoreham Technical Centre, Old Shoreham Road, Shoreham-by-Sea, West Sussex, BN43 5FG, United Kingdom†	Dormant
Ricardo Technology Limited	Shoreham Technical Centre, Old Shoreham Road, Shoreham-by-Sea, West Sussex, BN43 5FG, United Kingdom†	Dormant
Ricardo Transmissions Limited	C/O Ricardo plc, Shoreham Technical Centre, Old Shoreham Road, Shoreham-by-Sea, West Sussex, BN43 5FG, United Kingdom†	Dormant
Ricardo Pension Scheme (Trustees) Limited	Shoreham Technical Centre, Old Shoreham Road, Shoreham-by-Sea, West Sussex, BN43 5FG, United Kingdom†	Dormant
Ricardo Mayfly Limited	Elian Private Wealth, 44 Esplanade, St Helier, Jersey, JE4 9WG	Dormant

† Registered in England and Wales.

(1) 99% owned by Ricardo plc and 1% owned by Ricardo UK Limited.

(2) 49% of share capital and 97% of retained earnings owned by Ricardo Rail Limited and 51% of share capital and 3% of retained earnings owned by Pro-Partnership LLC.

(3) 49% of share capital and 80% of retained earnings owned by Ricardo Rail Limited and 51% of share capital and 20% of retained earnings owned by SSD Commercial Investment.

(4) 60% owned by Ricardo Beijing Company Limited and 40% owned by Chongqing Science & Technology Testing Center Limited.

(5) 40% owned by Ricardo Beijing Company Limited, 25% owned by Ricardo Hong Kong Limited and 35% owned by Jiangsu Urban Mass Transit Research & Design Institute Company Limited.

(6) 15% owned by Ricardo plc and 85% owned by Ricardo-AEA Limited.

In the opinion of the Directors, the comprehensive income for the year and equity at the reporting date which is attributable to non-controlling interests is not considered to be material. Non-controlling interests are set out above in footnotes (2) to (5).

### 39 Events after the reporting date

On 8 September 2017 the Group acquired the entire issued share capital of Control Point Corporation ("CPC") for initial cash consideration of £5.3m (\$7.0m), rising to total cash consideration of £7.8m (\$10.2m), subject to any adjustment to reflect normalised levels of working capital, the achievement of certain financial performance targets and the retention of specific individuals. CPC is a US-based full-service engineering firm which operates principally in the defence sector and has expertise in distributed software-based systems, fleet management technologies and the acquisition expands upon the Group's vehicle engineering capabilities.

The following table sets out the consideration paid for CPC, together with the provisional assessment of the net assets acquired:

	£m
<b>Initial cash consideration</b>	<b>5.3</b>
Provisional assessment of identifiable net assets acquired	3.3
Provisional goodwill and other acquisition-related intangible assets	2.0
<b>Total</b>	<b>5.3</b>

All of the initial cash consideration of £5.3m (\$7.0m) was paid after the year-end in September 2017. The acquisition was completed on a cash-free and debt-free basis, subject to normal levels of working capital.

Adjustments have not yet been made to identifiable net assets on acquisition to reflect their fair value, including the recognition of customer-related intangible assets separable from the goodwill arising on acquisition. It is expected that the remaining value of goodwill will be ascribed to the existence of a skilled, active workforce, developed expertise and processes and the opportunities to obtain new contracts and develop the business. The goodwill recognised is expected to be deductible for tax purposes.

Given the proximity of the completed acquisition of CPC to the date of approval of these financial statements, the provisional assessment of net assets acquired is based upon available financial information.

The provisional value for initial consideration and provisional assessment of net assets acquired may be adjusted in future in accordance with the requirements of IFRS 3 'Business Combinations' and the sale and purchase agreement.

The provisional assessment of net assets of £3.3m (\$4.3m) includes net trade receivables of £2.4m (\$3.1m) and amounts recoverable on contracts of £0.4m (\$0.6m), all of which is expected to be collectible.

Acquisition-related expenditure of £0.3m has been charged to the Consolidated Income Statement for the year ended 30 June 2017 and is disclosed as a specific adjusting item in Note 4.



# Additional information

- 160 Corporate information
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# Corporate information

## Group General Counsel and Company Secretary

Patricia Ryan

## Registered Office

Ricardo plc  
Shoreham Technical Centre  
Shoreham-by-Sea  
West Sussex  
BN43 5FG

## Ricardo plc registered company number

222915

## Registrars

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West Sussex  
RH10 1BG

## Stockbrokers

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London  
EC2V 7QP

Tel: 020 7597 5000

## Website: [www.ricardo.com](http://www.ricardo.com)

A PDF version of this Annual Report & Accounts can be downloaded from the Investors page of our website.

## Key dates

Final dividend record date	27 October 2017
Annual General Meeting	8 November 2017
Final dividend payment date	17 November 2017

## Shareholder services

Capita Registrars provide a share portal service, which allows shareholders to access a variety of services online, including viewing shareholdings, buying and selling shares online, registering change of address details and bank mandates to have dividends paid directly into your bank account. Any shareholder who wishes to register with Capita to take advantage of this service should visit [www.capitaregistrars.com/shareholders](http://www.capitaregistrars.com/shareholders).

## Shareholder enquiries

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Tel: +44 20 8639 3131 (for non-UK callers)

## Principal bankers

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55 Corn Street  
Bristol  
BS99 7LE

HSBC Bank plc  
Global House  
High Street  
Crawley  
West Sussex  
RH10 1DL

## Financial advisors

NM Rothschild & Sons  
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EC4P 4DU



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# Emissions legislation

Global tailpipe and CO<sub>2</sub> emissions legislation adherence are 'must haves' in the development budget of many of our clients

Vehicle	Region	2010	2015	2020	2025
Automotive & LCV	Europe	Euro 5	Euro 6a Passenger Cars: 130 gCO <sub>2</sub> /km	Euro 6d-TEMP - WLTP & RDE Passenger Cars: 95 gCO <sub>2</sub> /km	Euro 6d - WLTP & RDE Passenger Cars: 68 - 78 gCO <sub>2</sub> /km
	US (49 States)	Tier 2	2012-2016 standards	Tier 3 2017-2025 standards	
	California	LEV II	LEV III		
	China	China IV (Euro 4)	China 5 (Euro 5)	China 6a - WLTP & RDE	China 6b - WLTP & RDE
		Phase 2	Phase 3	Phase 4 (Passenger Cars; new standards for LCVs from 2018)	
	India	Bharat Stage IV (Euro 4 equivalent)		Bharat Stage VI (Euro 6 equivalent)	2022 standards
		2017 standards			
	Japan	Post New Long Term 2010 standards	2015 standards	WLTP based standards (proposed)	2020 standards
	Europe	Euro 3	Euro 4		Euro 5
	US (49 States)	Tier 2 for Class III; Tier 1 for classes I and II (harmonised with California)			
Motorcycle & Personal Transportation	California	California Motorcycle Limits: Tier 2 for Class III; Tier 1 for classes I and II			
	China	China III		China IV - WMTC	
	India	Bharat Stage III		Bharat Stage IV	Bharat Stage VI
	Japan	2010 standards		Euro 4 based standards	
	Taiwan	Euro 3 based standards		Euro 4 based standards	Euro 5 based standards
	Europe	Euro V	Euro VI		Euro VII
	US (49 States)	EPA 10	Phase 1 federal standards	Phase 2 (2018-2027) federal standards	
	California	EPA 10	Optional low NOx limits	Compliance of older vehicles to EPA 10	
	China	China IV	Phase 1 federal standards	Phase 2 (2018-2027) federal standards	
	India	Bharat Stage IV	Phase 1 standards	Phase 2 standards	China VI (proposed) Phase 3 standards (proposed)
Commercial Vehicles (Medium- & Heavy-Duty Trucks)	Japan	Post New Long Term	2016 standards	2016 standards	
	Europe	Stage IIIb	Stage IV	Stage V	
	US	Tier 4 Interim	Tier 4 Final		
	China	Stage II	Stage III (Nationwide) - Stage IV (Beijing)	Stage IV Nationwide (proposed)	
	India	Bharat Stage II (Tractors and CEV)			
	Japan	2006 Non-Road Standards	2011 Non-Road Standards	2014 Non-Road Standards	
	Europe	Stage IIIa	Stage IIIb		Stage V
	US	Tier 2	Tier 3	Tier 4 Switch & Line Locomotives	
	India	Not yet regulated		Proposed standards under discussion	
	Australia	Not yet regulated		Studies ongoing to adopt US legislation	

■ Pollutant Emissions Legislation    ■ Fuel Economy or CO<sub>2</sub> Emissions Legislation

## Glossary

- CEV** Construction Equipment Vehicles
- CO<sub>2</sub>** Carbon dioxide
- EPA** Environmental Protection Agency (United States)

- LCV** Light Commercial Vehicle
- RDE** Real-world Driving Emissions
- WLTP** Worldwide harmonised Light vehicles Test Procedure

**WMTC** Worldwide Motorcycle Test Cycle



Delivering Excellence Through Innovation & Technology

